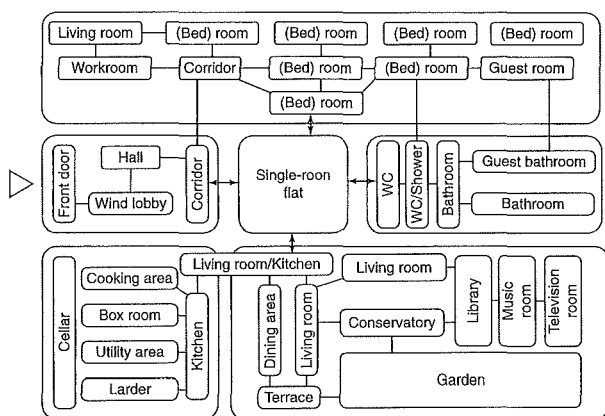


18

- 1 Functional diagram dependent on daily routines (UN Studio → refs)



- 2 Traditional spatial layout of room division 'from the single-room flat to the palace'. Read backwards, a programme for the spatial expression of uses and flexible uses of living space

room type	main occupation time sunlight desirable	
living room	mid-day to evening	
dining corner/room	morning to evening	
children's room	mid-day to evening	
bedroom	night early sunshine is desirable	

- 3 Periods of occupation and desirable sunlight in residential rooms

Living in houses, originally the spatial realisation of basic human needs, has developed in modern society into a complex interaction of a multitude of influences subject to the most varied requirements and individual quality standards.

The lifestyle, principles and pretensions of the (potential) inhabitants come up against building regulations, political subsidy ideas and their consequences for town planning and also (underlying ideological) architectural predispositions about location, type of building, development and ground plan.

Historical development

In the course of industrialisation and the movement of population to urban areas, residential building developed into a central task of the construction industry in the 19th century, and on account of the world wars this was still the case during the last century.

The planning preoccupations with privacy and prestige, which originated in the feudal system and still apply as models and clichés, have entered the awareness of a wide public. Prosperous urban society expressed this by building villas and impressive mansions. In parallel, much Victorian accommodation was built as dense blocks in rental districts as a result of the massive (working class) housing shortage and with the aim of maximising land use and profit.

The architects of the modernist movement (and their successors) developed opposing concepts to those of the 'stone' city. They investigated the individual home, its **lighting** and **orientation** → 3, the optimal (minimum) **room size** and **functional layout** → 2 and also rational and standardised methods of construction. The results ranged from ambitious private houses to new 'fresh from the drawing board' housing developments.

The present day: community and individual

Modern housing requires the separation in space and time of individual and community interests within the house as well as meeting the demand for privacy and publicity (or anonymity) in the urban context → 1.

The increasing relaxation of traditional family lifestyles and, as a result of the information age, the approaching end of the separation of housing and workplace mean that the classic functional and utilitarian procedures inside houses → 2 have to be re-examined. The established terms like living room or children's room often have little validity.

The place of residence is understood to be a private space with controlled and graduated access from the outside world. The classic common and individual areas within a house are becoming less significant in terms of area, and the 'multi-purpose room' (living-working room, shared living space as in a flat etc.), which occurs in both private and public housing, is developing into a significant room type.

Room division and functional neutrality

The consequence of the individualisation of lifestyles could be customised layouts with differentiated and often luxurious room division, but it could also be a functionally neutral division of space with qualitatively similar rooms suitable for flexible use by families, flat sharers, 'multi-generation living' groups or living-and-working models.

These considerations result in increased significance for the neutrality of the developing decor.

Residential
buildings

BASICS

Design basics
House-building
policy

The task of a century

Among the changes in society caused by industrialisation, since the middle of the 19th century house building has developed into a central activity of the construction industry. Housing shortage and mass poverty became a decisive political dimension, which still continued into the 20th century due to the World Wars.

The regulation and encouragement of house building is therefore an essential aspect of national construction policy. Political instruments have been developed in the form of planning laws and building regulations → p. 56, intended to set **minimum standards** to protect privacy, avoid danger and protect health.

Laws to subsidise housing construction and a repeatedly modified system of financial grants and tax exemptions have been set up to support private investment in rented and owner-occupied housing (**property incentives**). In consideration of the current over-supply of housing and increasing demands in the market regarding area and quality, the subsidy laws have been amended in recent years.

The essential subsidy instruments in Germany are: the **Law to Subsidise House Building**; the **state subsidy for house building**, laid down in the Law to Subsidise Social Housing of 13/09/2001. The subsidising of house building includes the new construction of flats with subsidised rents, the new construction of owner-occupied housing, the purchase and refurbishment of existing houses and the purchase of rights of occupancy.

Housing subsidy is carried out at the **state level**: the extent of grants, the size details of subsidised houses and application conditions can therefore differ from state to state and are laid down in the relevant **housing subsidy regulations** → ❶. The target housing subsidy group are households whose income does not exceed the level stipulated in the laws and regulations, and also households with two or more children and households with disabled members. The subsidy is in the form of loans at preferential rates, grants, guarantees, housing entitlement certificates and the provision of cheap building land.

Household size	Maximum living area	for each further person belonging to the household, the living area can be exceeded by max. 10 m ² .
1 person	50 m ²	
2 persons	60 m ²	
3 persons	75 m ²	
4 persons	85 m ²	

❶ Limits on the living area in subsidised housing (example)

Owner-occupied House Allowance Law

This legislation provides for a limited period a subsidy from taxation via a fixed annual allowance for the purchase of owner-occupied flats and houses. The target group for this allowance is households whose income does not exceed the limits laid down in the law. On account of the current over-supply of housing, the political justification for this law is often questioned.

Housing area regulation

The 'Regulation for the calculation of the housing area' of 25/11/2003 is used to work out the area of houses and flats for the purpose of the Law to Subsidise House Building. The area of a house or flat includes the floor area of all rooms which belong exclusively to the house or, in the case of a residential home the areas intended for the sole use of the owner → ❷.

The floor area of a room is determined from the clearance space between building components and starts from the face of the cladding of the building component → ❸. The floor area is measured in the completed room, or can be calculated from a suitable construction drawing. Floor areas are calculated according to → ❹.

Living area includes:	Living area does not include:
all rooms which belong solely to the house, or are intended for the sole use of the occupants, including conservatories, swimming pools, etc. (if enclosed on all sides), balconies, loggias and terraces	subsidiary rooms (cellars, store rooms, cellar replacement rooms, wash houses, attic rooms, drying rooms, heating rooms, garages), rooms which do not correspond to the requirements of planning law for the relevant use, offices

❷ Rooms included in living area (housing area regulation, excerpt)

floor area of a room includes:	floor area of a room does not include:
clear area (from face of cladding) between building components, including the area of door and window frames, skirtings, permanently installed objects, free-standing installations, built-in furniture, movable room dividers	chimneys, masonry cladding, claddings, pillars (from 1.5 m height and 0.1 m ² floor area), stairs and landings (from 3 steps), door niches, window and wall niches (which do not reach to the floor or are at least 0.13 cm deep),

❸ Floor area of a room included in living area (housing area regulation, excerpt)

complete	rooms and parts of rooms with a clear height of at least 2 m
half	rooms and parts of rooms with a clear height of at least 1 m and less than 2 m, unheated and fully enclosed conservatories, swimming pools etc.
normally a quarter, at the highest a half	balconies, loggias, roof gardens and terraces

❹ Inclusion of floor areas in the calculation

KfW Subsidy Bank

The KfW Subsidy Bank is a public body with its capital provided by the Federal Republic of Germany and the states. The main emphasis of its activity is the provision of favourable loans for the encouragement of house building. The subsidies are in the form of a subsidy programme with fixed aims. Currently (autumn 2008) the following programmes are active:

KfW property programme

for the building or purchase of owner-occupied houses and flats.

Ecological building

for the construction of passive houses, KfW energy-saving houses and the installation of renewable energy heating systems

Housing modernisation

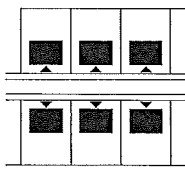
for the modernisation and repair of residential buildings with emphasis on the reduction of energy consumption

CO₂ building refurbishment plan

for single measures intended to reduce the energy consumption of old buildings

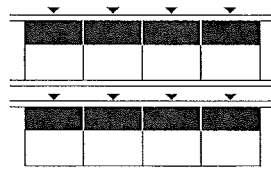
Solar electricity production

to finance photovoltaic systems on residential buildings



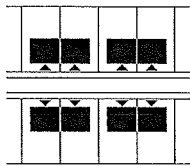
DETACHED HOUSE (ESTATE)

plot	350 – 450 m ²
storeys	1–2 (+ attic)
gross floor area	150–160
floor-area ratio	0.3–0.5
inhabitants/ha	70–90



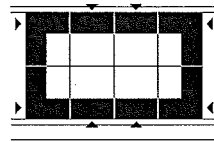
TERRACED BUILDING

plot	≥ 625 m ²
storeys	2–4 (+ attic)
gross floor area	≥ 500
floor-area ratio	≥ 0.8
inhabitants/ha	≥ 400



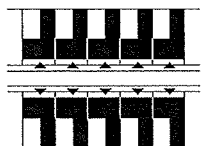
SEMI-DETACHED HOUSE

plot	250–300 m ²
storeys	1–2 (+ attic)
gross floor area	150–160
floor-area ratio	0.5–0.6
inhabitants/ha	115–135



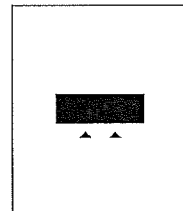
BLOCK DEVELOPMENT

plot	≤ 1550 m ²
storeys	5 (+ attic)
gross floor area	1250
floor-area ratio	≥ 0.8
inhabitants/ha	400–450



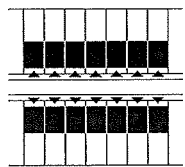
LINKED/COURTYARD-GARDEN HOUSE

plot	200 – 250 m ²
storeys	1 – 2 (+ attic)
gross floor area	150 – 160
floor-area ratio	0.6 – 0.8
inhabitants/ha	150 – 180



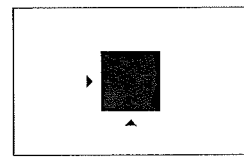
NARROW HIGH-RISE

plot	≥ 5000 m ²
storeys	10
gross floor area	600/storey
floor-area ratio	1.2
inhabitants/ha	approx. 450



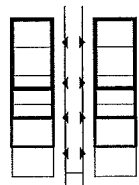
TERRACED HOUSE

plot	150 – 200 m ²
storeys	2 – 3 (+ attic)
gross floor area	130 – 150
floor-area ratio	0.6 – 0.9
inhabitants/ha	200 – 250



SQUARE HIGH-RISE

plot	≥ 1875 m ²
storeys	10
gross floor area	225/storey
floor-area ratio	1.2
inhabitants/ha	approx. 450



STEPPED HOUSE

storeys	1
gross floor area	130 – 150/terrace
floor-area ratio	1.5 – 2.0
inhabitants/ha	300 – 350



1 Town planning parameters of various house types (indicative)

HOUSING DENSITY

Parameters

The extent of residential development (urban housing density) is an important measure in public land-use planning. The urban housing density is laid down in the development (zoning) plans of cities and councils and is the indirect result of the provisions of planning law regarding the permissibility of building projects in unplanned inner areas and in outer areas → p. 56. The essential statutory parameters describing urban housing density are the plot coverage ratio (the built area related to the plot area), and the floor-area ratio (the total area of all floors related to the plot area), as well as provisions regarding the number of full storeys and the height of buildings → p. 63.

Urban housing density and house type

The urban housing density has a considerable influence on the selection of house type, determines the type and extent of development and specifies the land use of a housing development. The urban housing densities of various types of housing (housing density) are shown in → 1, as described by the statutory parameters. The average population density (inhabitants/m²) is also shown for clarification. The density increases in a range from free-standing detached houses, semi-detached houses, linked and terraced houses to multi-storey residential buildings, block developments and stand-alone blocks. Based on the required plot area, dense terraced and block development achieves similar densities to multi-storey stand-alone blocks.

Housing density and housing quality

The qualitative evaluation of housing density is complex and depends on a multitude of factors. It cannot be estimated solely from a plot or group of houses, but is also influenced by the larger scale urban development conditions. The term quarter has become established to describe an urban planning unit with its own infrastructure (shopping, recreational provision, schools, kindergartens and connections to local transport).

Further points of interest are the number of inhabitants for whom the infrastructure is adequate and the accessibility (transport provision and times). These parameters interact with the requirement for housing space per inhabitant and other spatial aspects concerning privacy and individuality as well as the long-distance connections, distance from and relation to city centres, plot prices, accessibility of workplaces etc.

Model calculations demonstrate that with a floor-area ratio of 0.8 (related to net building land) and development with, for example, multi-storey blocks in rows, the result is quarters where 6500 inhabitants can live on a gross area of 75 ha (900 × 900 m). This results in distances from supply facilities of not more than 500 m, which can be reached on foot or by bicycle.

In contrast, with a floor-area ratio of 0.4 and development of detached houses, 6500 inhabitants will live in a quarter with an area of 235 ha (1500 × 1500 m), which is too far on foot (particularly for elderly people) and too small for public transport, so that a car has to be used for daily shopping. In terms of the supply of energy in pipes or cables, it can be stated as a simplification that the cost for a floor-area ratio of 0.4 is nearly double that for 0.8.

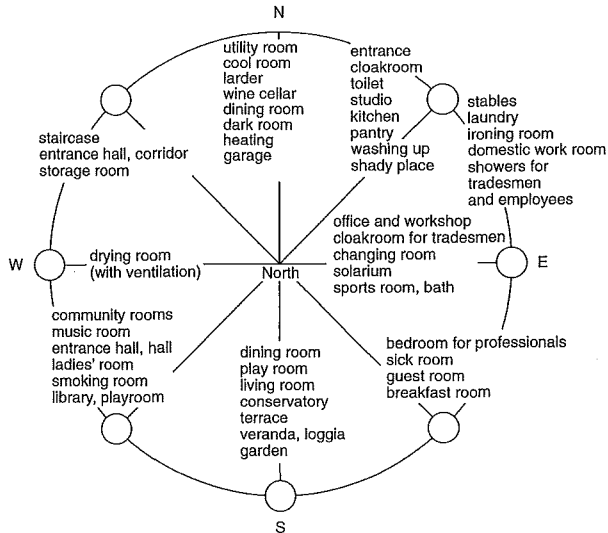
These considerations should make clear that the apparent advantages of living in a green belt mean that large parts of our country are scarcely habitable without using a car, which offers no perspective for a sustainable use of land and energy (Bott, Haas → refs)

Residential buildings

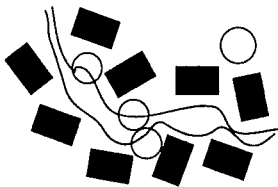
HOUSING DENSITY
Parameters

Residential buildings

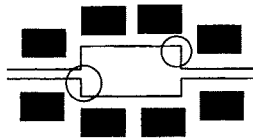
ORIENTATION Layout of buildings



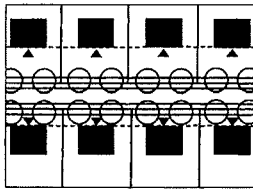
1 Optimal orientation of rooms



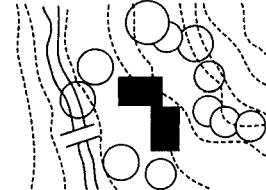
Village environment



Group of houses

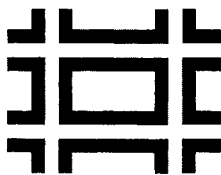


Estate

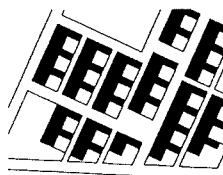


Building in the landscape

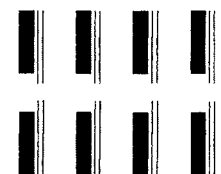
2 Detached housing



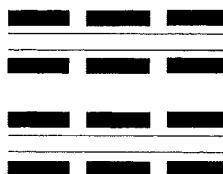
Block



Courtyard



Cells



Rows



Naturally developed town



Planned town

3 Housing in blocks

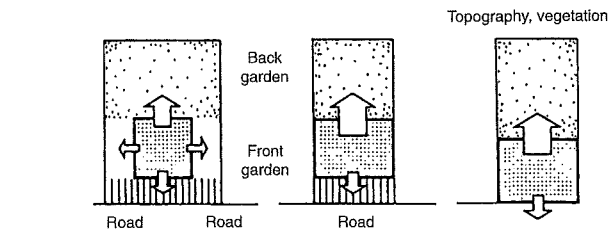
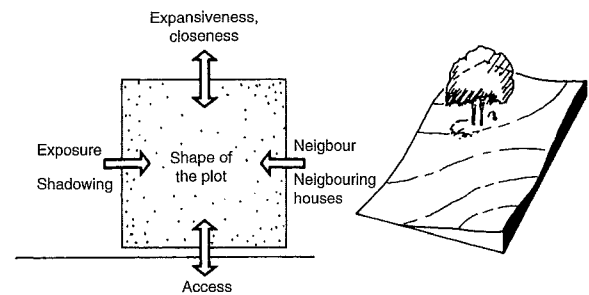
ORIENTATION

Layout of Buildings

Detached housing → 2 (detached and semi-detached houses with boundary walls) offers the opportunity to orientate a building in four (three) directions of the compass → 1 (although at the expense of high development costs and low urban planning density → p. 137).

The plots are mostly narrow and long, in order to reduce the road frontage as much as possible. In this case, plots to the **south** of the road are more favourable. This enables a north-facing arrangement of the rooms next to the entrance to the road and the arrangement of the living rooms and bedrooms away from the road, with tranquillity and sunshine (east – south – west) and an exit to and view of the garden.

If the plot is **north** of the road, then the house should be sited at the back of the plot, despite the extra expense of a driveway, in order to exploit the sunny front garden. Plots to the west and east of a (north–south) road should place garden and living rooms on the wind-protected east side (arrangement of the house to the north of the plot), so that no neighbouring buildings shadow the low east sun, as with an east–west road.



4 Relation of house to plot

For **housing in blocks** → 3 (built in blocks and rows), most of the houses or flats will be orientated in two opposing directions with different qualities (view, lighting, noise).

Traditional block development, with varied layouts and orientations of the flats, the planning of the layout of each flat should attempt to compensate for unfavourable lighting conditions. In addition to the traditional functionally neutral corridor floor plans, open, flowing and flexible floor plans can also be used for such situations. The quality of life in block structures results from the multitude of views out and through the street and the inner courtyard, which can be emphasised in the design.

Compass direction is a central consideration of modern town planning. An **east–west orientated arrangement of rows** with green areas in between can achieve (at the cost of public space and the risk of a certain monotony of appearance) uniform lighting and orientation of as many flats as possible → 3.

ACCESS

Detached and Terraced Development

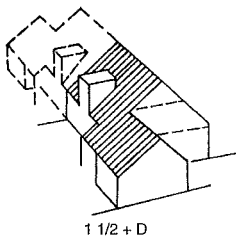
Residential buildings

ACCESS

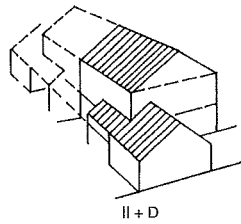
Detached and terraced access
Passage access
Stepped houses
Vertical access

MBO

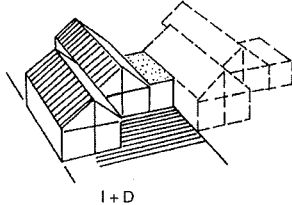
see also: Fire protection p. 511



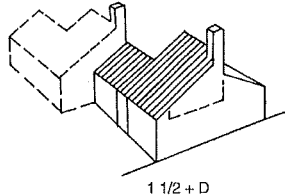
1 1/2 + D



II + D

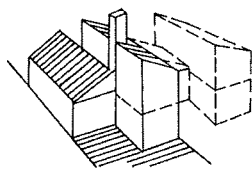


I + D

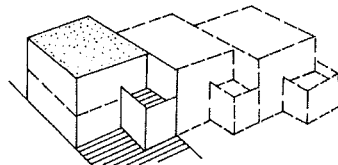


1 1/2 + D

1 Detached/semi-detached houses

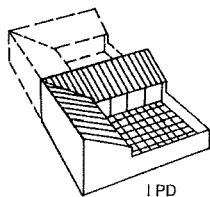


1 1/2 FD

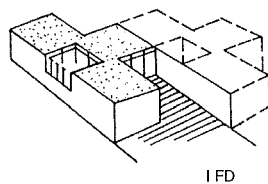


1 1/2 PD

2 Linked houses

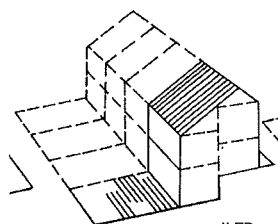


I PD

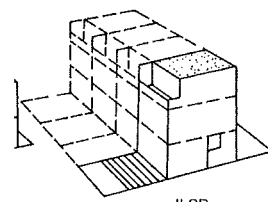


I FD

3 Houses with courtyard garden

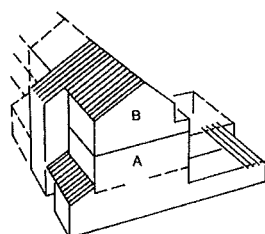


II FD

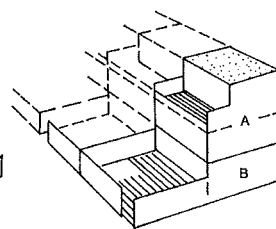


II SD

4 Terraced houses



III SD



III FD

A - main residence

B - granny

5 Town houses

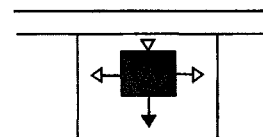
The selection of a house type includes decisions about development, access and utilities. This has an important effect on the proportions and organisation of the plan and is also an important cost factor.

Access is also the subject of a multitude of building regulations because of its function as **escape route** → p. 511. The route to the house or flat and the connection of the houses to each other represent an important **location for social interaction** as an immediate part of the surroundings of the inhabitants.

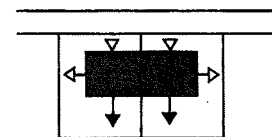
Access principles

The following forms of access can be differentiated according to the principle of adding houses:

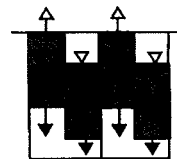
- detached house
- (horizontal) **row**: terraced house, passage access
- (vertical) **stacking**: access with lifts and stairs



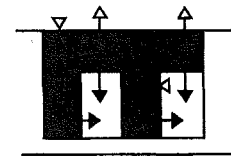
Detached house



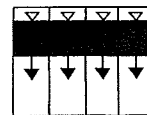
Semi-detached house



Stepped houses



Houses with courtyard garden



6 Access to single and rows of houses

- ▽ Front door
- ← Main orientation
- ← Subsidiary orientation

Detached house and row access

The individually accessed, detached house standing on its own plot is the prototype for the 'owner-occupied' house. It has a prestigious level access from the road, which is reached through an area at the front ('front garden'). It has direct access from each storey to further private or semi-public open spaces (e.g. garden, terrace, inner courtyard or roof garden) → 2.

With row access, as with individual access, each residential unit, as its 'own' **terraced, linked or courtyard-garden house**, is accessed on the level from the road and has a direct exit into the open air → 2 – 4. There is a direct relation between private and public space. A sensible height is 2–3 storeys.

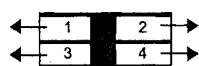
Town houses → 5 also use this access principle for an upper floor flat, which in this case has its own front door and stairs. Terraced houses with good residential value offer the most economic form of house with garden → p. 144.

ACCESS

Passage Access

Section

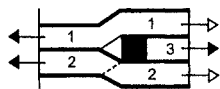
Plan



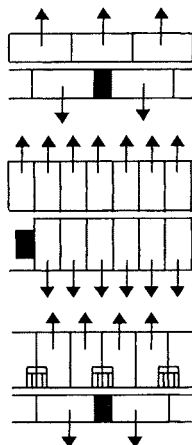
a Central access



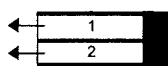
b as maisonnette



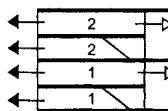
c as split-level



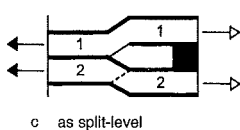
1 Internal passage access



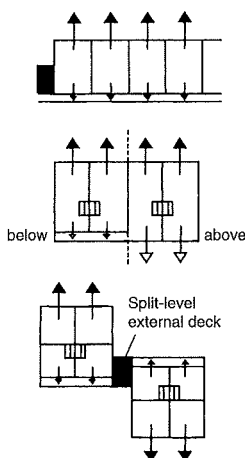
a External deck



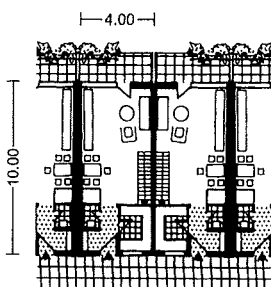
b as maisonnette



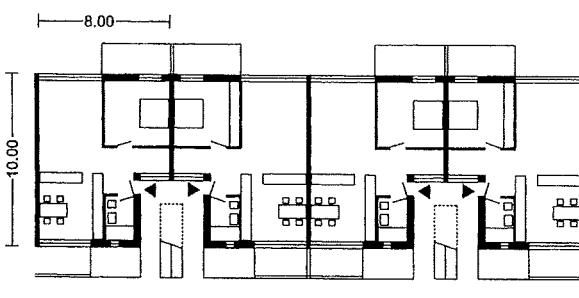
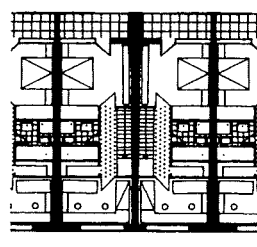
c as split-level



2 External passage access



3 Maisonnette with external passage access

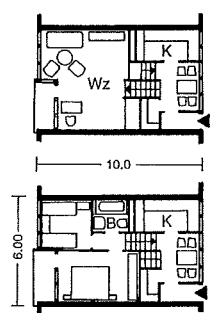


4 External passage access, living area as → 3 Arch.: Kohn (Schneider → refs)

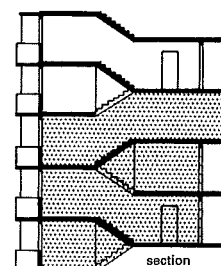
Deck access means that the individual storeys of a block of flats are accessed along horizontal **passages**, which are connected to each other and to the entrance by one or more internal, projecting or free-standing **fixed vertical structures** (stair shafts, lifts). The flats are organised along the passages singly, on two sides or on three sides (with an internal function zone). The passages can be arranged internally (**internal passage** → 1) or along an external surface (**external deck** → 2).

They have (with corresponding detailing) the appearance of a **semi-public street** → p. 139. The route of this 'street' directly in front of a (for internal passages unlit) wall of the flat produces a tendency to a one-sided orientation of the flat.

The variety of possibilities with this access type therefore results from the **layering** of multi-storey and mezzanine residential units, which offer the possibility, by building over the access passages, of double-aspect living on two sides of the flat.



5 Gallery access house, split-level flats



Arch.: Hirsch

Internal passage

If the access passage is inside the building, this is called an **internal passage block** → 1. With this solution, living on one level leads to single-sided orientation. It is therefore better to divide residential units over two or more storeys → 1 (b+c).

External passage

In an external passage building, the horizontal access is along one long side of the structure → 2. The open passage is not without problems under the climatic conditions in Central Europe, and in addition it is normally practical to place only subsidiary rooms next to the external passage → 2 (a).

Living spaces on only one level are therefore particularly suitable for flats and studios → 4. It is better if the residential unit extends over two or more storeys → 3. If the floor levels are staggered by just **half a storey in height**, this produces favourable preconditions for the overlapping of functionality and stratification → 2 (c). The range of possible variations is therefore considerably extended if the residential units are not the same width for the entire depth of the building, but rather overlapped with the neighbouring unit.

Horizontal access to **every second storey** → 2 (b) permits desirable arrangements of larger residential units on different levels, combined with small units at the entrance level. Good solutions also result from the alternating arrangement of the external passage zones. Symmetrical stacking of maisonnettes or a corresponding arrangement of split-level flats makes it possible to limit the number of horizontal access points.

Residential buildings

ACCESS
Detached and terraced access
Passage access
Stepped houses
Vertical access

MBO

ACCESS

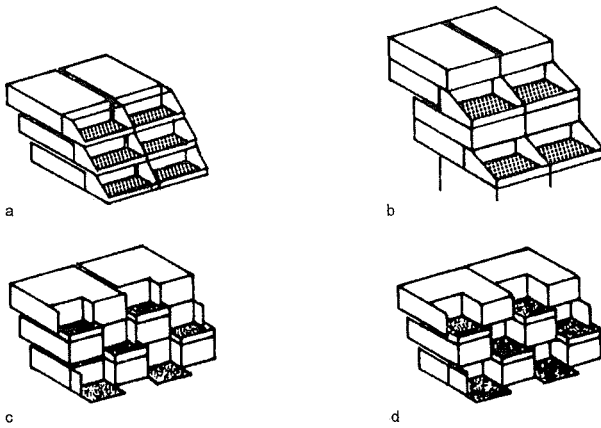
Stepped Houses

Residential buildings

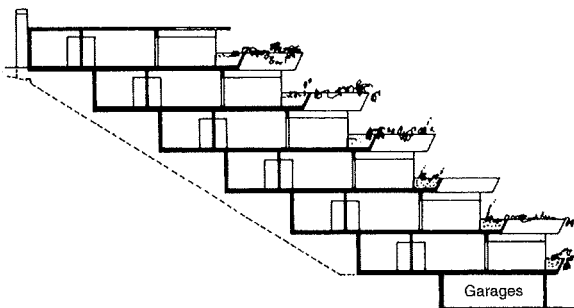
ACCESS

Detached and terraced access
Passage access
Stepped houses
Vertical access

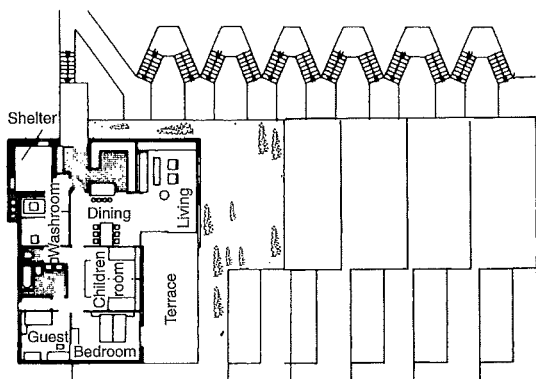
MBO



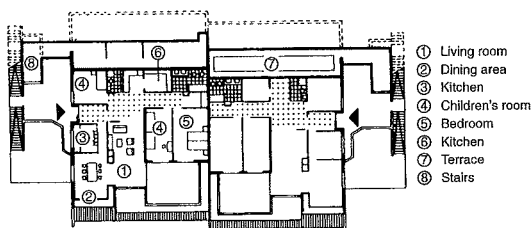
1 Possible one- and two-storey arrangements of stepped flats with the open-air terraces wholly or partially recessed into the body of the building



2 Section → 3



3 Stepped terrace house, floor plan Arch.: Schmidt + Knecht



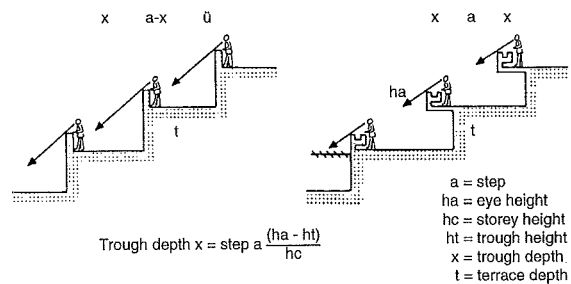
4 Stepped terrace house Arch.: Stucky + Menli

Steeply sloping sites encourage the construction of stepped buildings. These can be **stepped on one or two sides** → 2 + 6. The terracing can be produced by setting back residential units of similar depth or through the arrangement of varying depths of unit, decreasing towards the top. The stacking angle (storey height to terrace depth) mostly corresponds to an average slope of 8–40°. This results in **generous terraces** as space for relaxing, working or for children to play, like a ground-floor flat with garden, usually facing south, protected from the inward look of strangers but with an unobstructed view out. **Planting the parapets** enhances the residential quality.

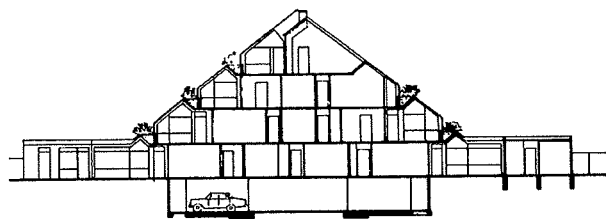
The advantages of large open-air terraces has and does also lead to the construction of stepped houses on level sites, sometimes built over large spaces. The resulting unlit rooms on the lower floors are not, however, without problems.

Trough depths

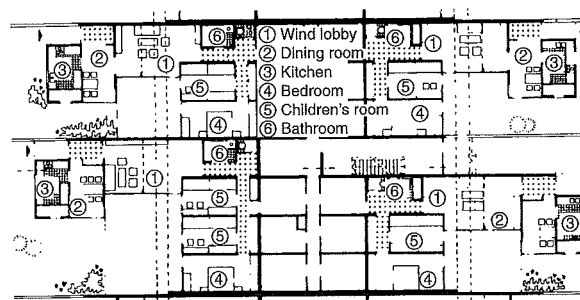
If an open view of the downhill terrace is to be prevented, then the necessary trough depth depends on the storey height and the horizontal repeating dimension → 5. More favourable conditions regarding the possible view are produced if the terrace is recessed into the body of the building → 1.



5 Relationship of the horizontal repeating dimension a and trough depth x



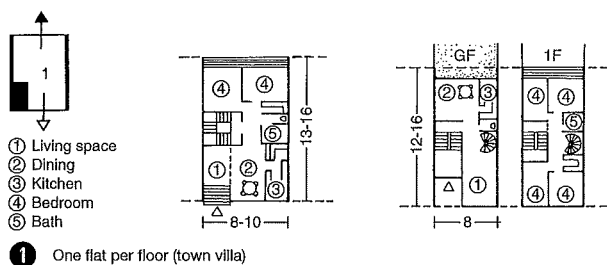
6 Section → 7



7 'Wohnhügel' (Hill House), ground floor Arch.: Frey, Schröder, Schmidt

ACCESS

Vertical Access



Identical and similar flats are 'stacked' one above the other over a number of storeys and accessed via a common stairway. One or more flats can be connected at each floor. According to the number of flats, this is called **one, two, up to four (or multiple) flats per floor** access. The stairway in this case becomes a semi-public part of the building → p. 139.

One flat per floor → ①

There is access to only one flat on each floor. This is relatively uneconomic due to the high proportion of the total floor area taken up for access, but can often give the feeling of living in a 'stacked terrace'. The flats are also marketed as town villas. There is a general limitation to four floors without a lift.

Two to four flats per floor → ② - ④

Two flats per floor is the most common access method, with balanced advantages of residential quality and value for money. The arrangement allows various (and flexible) floor plan solutions → ⑥ and offers good possibilities for adaptation in every compass direction.

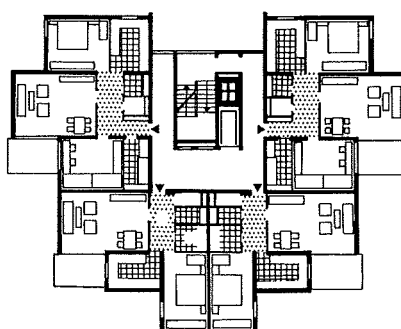
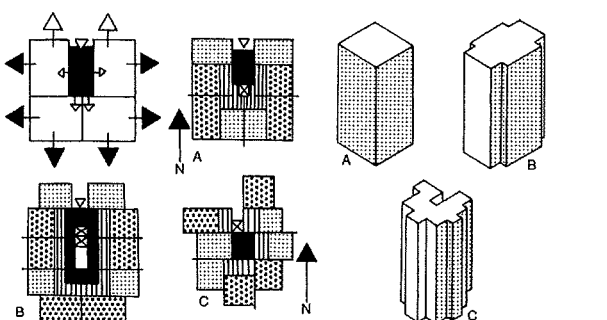
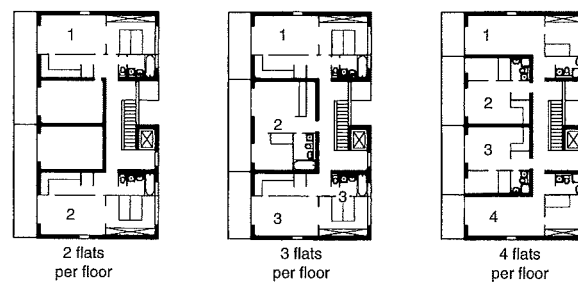
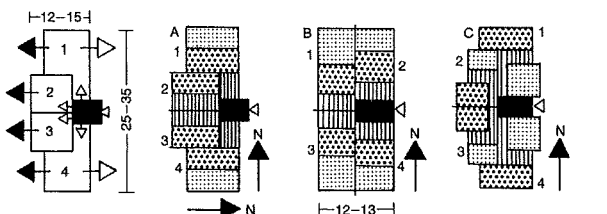
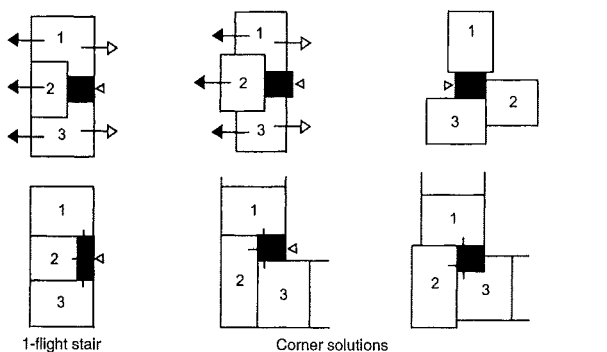
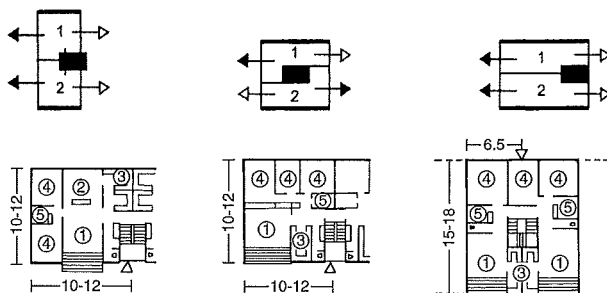
Three flats per floor offers a favourable combination of residential quality and value for money. This layout is also suitable for corner buildings → ③. Flats with differing numbers of rooms can be arranged on each floor (e.g. 2-, 3- and 4-room flats). **Four flats per floor** offers an adequate combination of residential quality and value for money if the floor plans are designed appropriately. In particular the so-called **point houses** → ⑤ + ⑦ enable differentiated orientation of flats on each floor.

Lifts are required for residential buildings of more than five full floors → p. 128. If a residential building is more than **22 m** above ground level, then the provisions for **high-rise buildings** apply → p. 244.

Residential buildings

ACCESS

Detached and terraced access
Passage access
Stepped houses
Vertical access
MBO

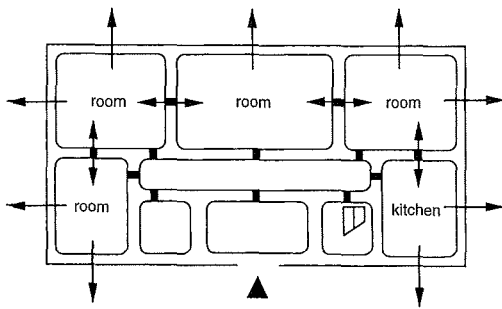


FLOOR PLANS

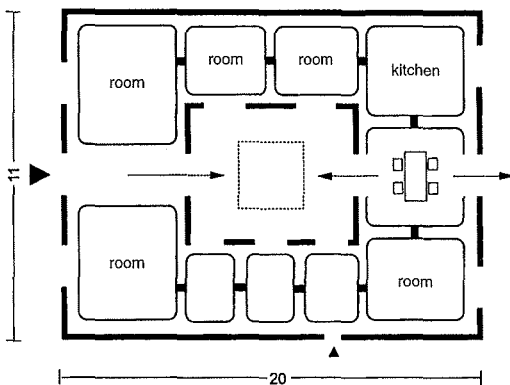
Houses

Residential
buildings

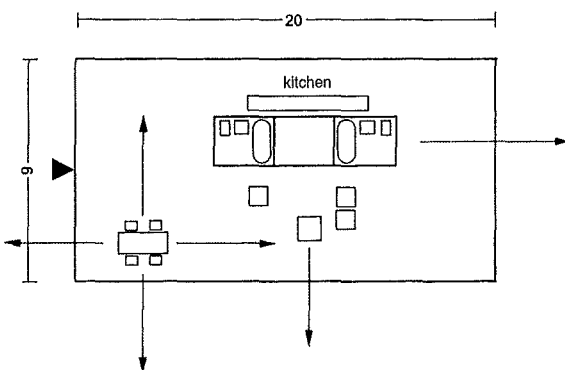
FLOOR PLANS
Houses
Flats



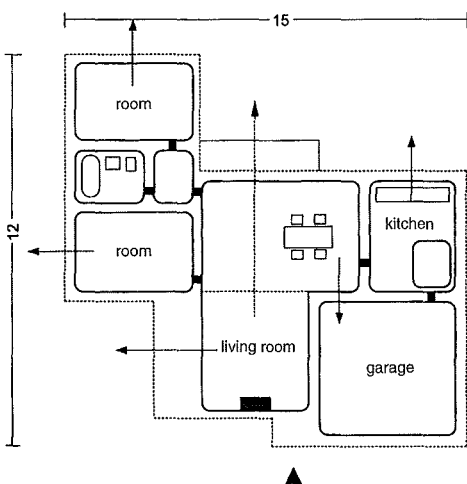
1 The 18th-century house



2 The atrium house



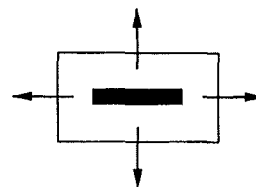
3 The open plan



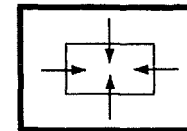
4 The flowing floor plan

The plan of a house is the result of a multitude of influential factors. In addition to the local conditions like plot layout and orientation, the current building regulations and decisions made about access, the design of many plans is determined by spatial ideas (in their combined effects):

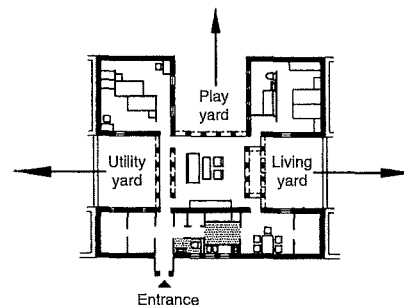
- the prestigious, extroverted idea of publicity → 5
- and the introverted idea of privacy → 6



5 Publicity



6 Privacy



7 Overlapping

Arch.: Ungers

The '18th-century house' → 1

The house was formerly developed as an axially laid out one- or two-storey plan based on feudal precedents. The free-standing building is lit on all sides and has an architecturally prestigious entrance and garden side; the living rooms and bedrooms (and to some extent service areas) have mostly similar floor areas and are distributed around and connected to a hallway arranged along the building axis.

The atrium house → 2

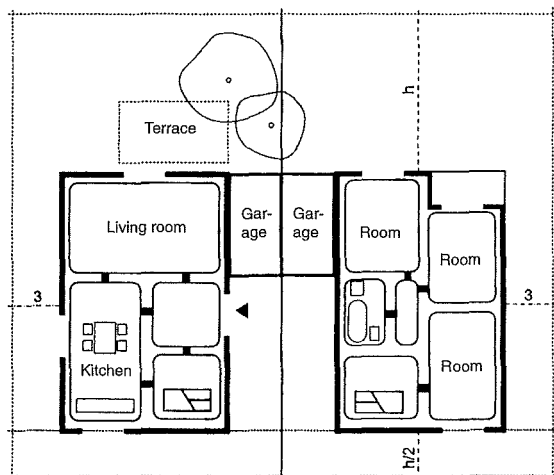
The atrium house is one of the classic urban house types. All the rooms of the one- or partially two-storey building are arranged round a private atrium, which also provides access and light. Contact with the outside world is entirely on the street side. The atrium plan is not fully practical for houses in Northern Europe (access from the open air or many entrances) but is an extremely popular model concept → 7.

The open plan → 3

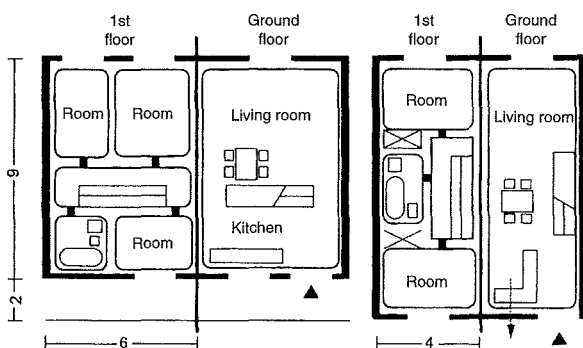
The open plan attempts to meld together the inside and outside spaces as far as possible through an almost complete lack of solid (unglazed) external walls. The aspects of privacy and publicity are (supposedly) neutralised. Minimalist and often subtly adapted fittings increase the contrast to a total view.

The flowing floor plan → 4

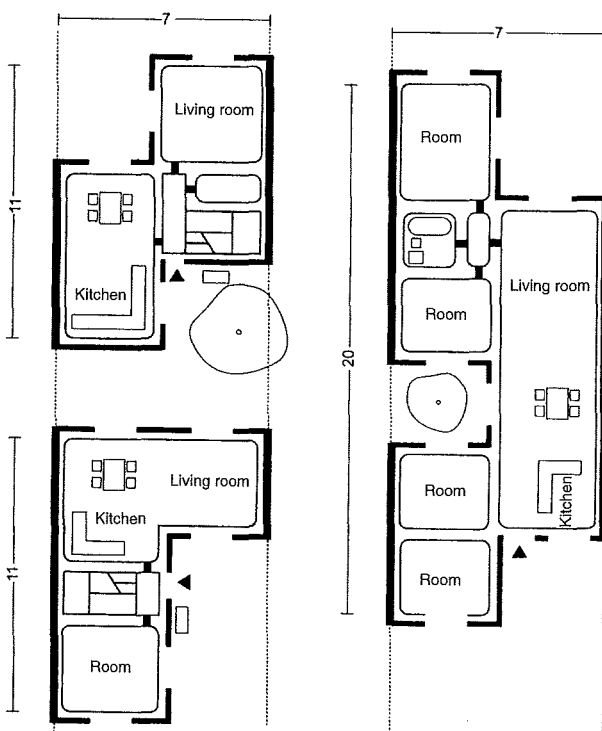
The flowing (also: organic) floor plan is developed from an analysis of the functional relationships between the individual areas of the plan and is often customised for a particular user group. This leads to differentiated zones running into each other, with interesting views without obstruction by neutral intermediate zones.



1 Detached, one-family house, ground and first floor plans (mirrored)



2 Gallery access house, terraced house (minimum dimensions)



3 Staggered and angled terraced houses

4 Patio house

FLOOR PLANS

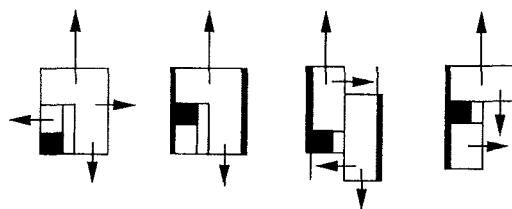
Houses

Detached, one-family house → 1

The detached, one-family house is the adaptation of the 'middle class house' → p. 143 for private house building on new estates. Plot sizes, infrastructure and setback rules are often intended for this type.

Because of the limited road frontage of the plot, the original plan is mostly rotated so that the entrance is at the side. The driveway becomes a (garage) access. The building has light on all sides, and the architectural pretensions of the original are often preserved only as clichés. The division of the floor plan is simple and rational. The common area with kitchen can extend over the entire depth of the building and receive light on three sides. The central hallway arrangement leads to an economic division of the first floor with little area wasted for access.

The lack of semi-public external areas due to the proximity of neighbouring houses is often seen as a fault with this house type and is remedied by the users with improvised offsetting measures (fences, pergolas, awnings, carports etc.).



5 Detached and non-detached house types

Terraced house and gallery access → 2

Terraced houses often give the feeling of living in one's own house. Attempts are therefore often made to produce the spatial repertoire of a detached house → 1.

Building in a row restricts the possibilities for direct lighting to two façades so that, with economic building depths of up to 12 m and widths between 4 and 8 m, the existence of a badly lit or dark middle zone containing the stairs, subsidiary rooms and often also the dining area becomes unavoidable. This can be countered with intruding communal areas receiving daylight from both façades, which enables the different qualities of the two sides of the house (environment, compass point etc.) to be experienced together.

The access gallery, if it is appropriately generous, produces a transfer of the terraced house idea into blocks of flats. The passage projecting on one side results in reduced lighting there and makes less depth possible for the flats. It is therefore common to provide transverse stairs when two-storey plans are used.

Half-open external area → 3 - 4

When angled and staggered terraces are built on rather more generous plots, simple alterations of the floor plan geometry can result in various protected private and semi-public external areas for the same or similar plan area (and room layout).

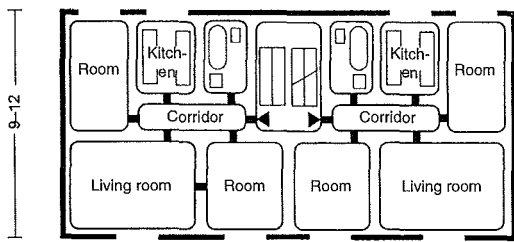
This is often achieved by moving floor plan areas together → 3 or by moving them apart and creating external areas → 4. Internal rooms can be oriented toward these external patio areas.

FLOOR PLANS

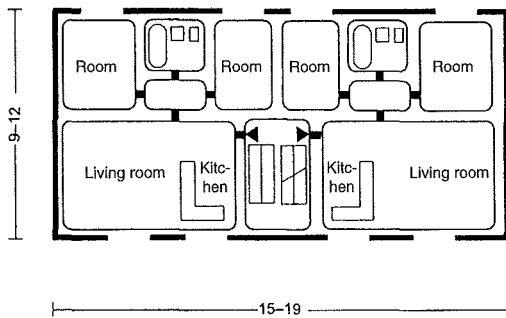
Flats

Residential
buildings

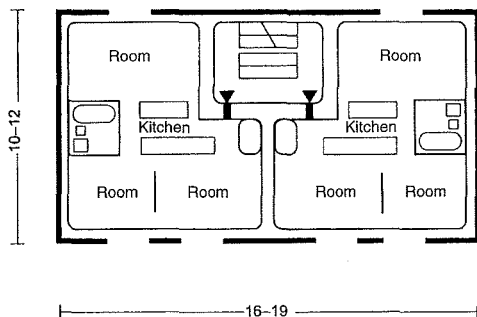
FLOOR PLANS
Houses
Flats



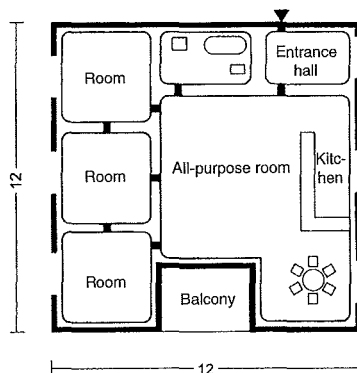
1 Classic plan with two flats per floor and central corridor



2 Grouped room floor plan



3 Central function zone

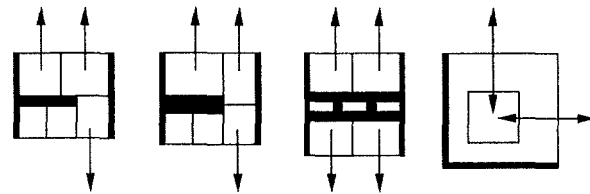


4 Centre as all-purpose room

Central corridor plan → 1

The central corridor plan is the classic floor plan of late 19th-century urban apartment blocks. The rooms are arranged along the two façades and are separated by the (load-bearing) middle wall and the central corridor parallel to it. All rooms can be accessed and used separately. Common and individual areas can be arranged on opposing sides of the façade and related to the particular qualities of the specific side of the building.

There is natural lighting to all living areas and, when the building is deeper, the unlit central corridor can be widened into a central hall. The central corridor style flat is accessed either axially or sideways through a front zone. In the age of functionally neutral flats, the central corridor plan is still a popular and functional type.



5 Typological development from central corridor to all-purpose room

Grouped room floor plan → 2

The idea of the grouped room floor plan developed at the start of the 20th century and is based on the separation of areas inside the apartment into two 'room groups': the living areas (living room, kitchen and dining area) and the sleeping area (bedrooms and bathrooms).

The characteristic feature of this type of grouped room layout is the so-called 'slipper corridor', a minimised corridor which combines the two bedrooms and the bathroom into one spatial unit and is separated from the living areas by a door. The spatial separation of the two room groups is intended to produce less disturbance within the flat with its small floor area and minimal use of space for access.

Central function zone → 3

In buildings of greater depth, the central area of the flat can be widened to form a zone of subsidiary space and the façades can be completely used for living areas. Bathrooms with artificial lighting (or lit indirectly from other areas of the flat), kitchens, cupboard and storage areas can be placed here, and appropriate passages and spaces provide the connection to the outside rooms.

Widened central corridor → 4

As an alternative to → 3 in free-standing point houses → p. 142 4, the central area of the flat can be usefully widened to form an (all-purpose) living room as the centre of the flat. The resulting space serves both as living room and access and is lit indirectly through the other rooms or directly through appropriate recesses in the façade (e.g. recessed balconies).

The all-purpose room is typologically comparable to the atrium, and ideally forms a functionally neutral communication (and play) area. A definite functional (use) description is, however, often difficult.

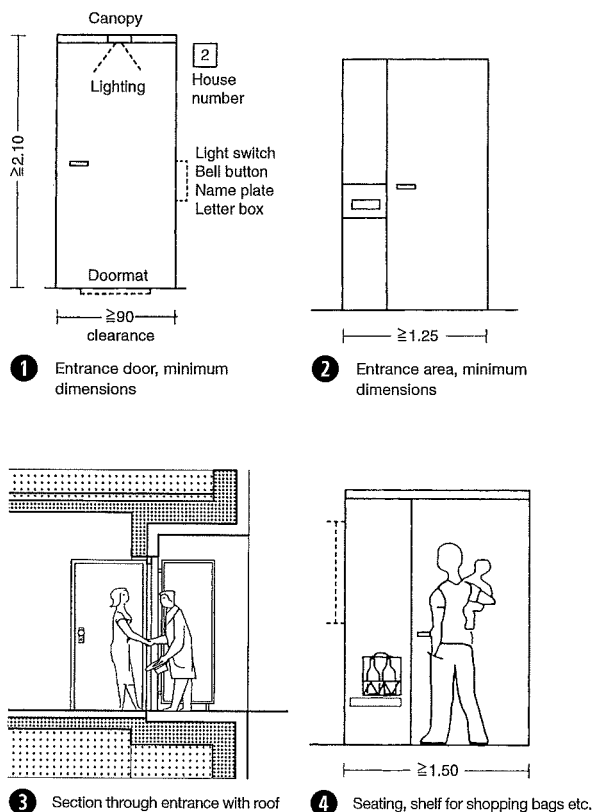
Residential buildings

ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages

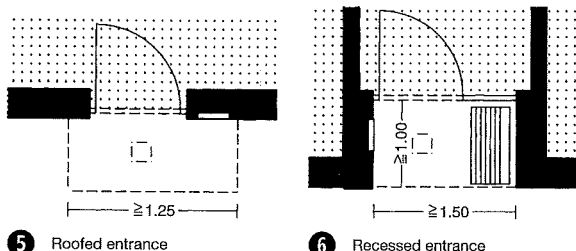
BS EN 81
BS EN 15644
DIN 4109
DIN 18025
MBO

see also: Sound
insulation p. 475
Doors p. 114
Lifts p. 128



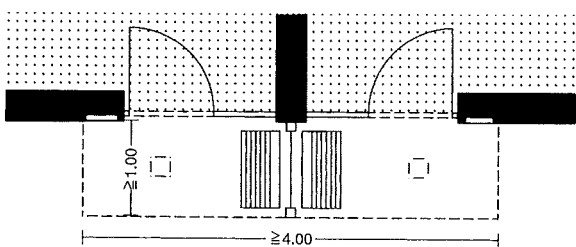
3 Section through entrance with roof

4 Seating, shelf for shopping bags etc.

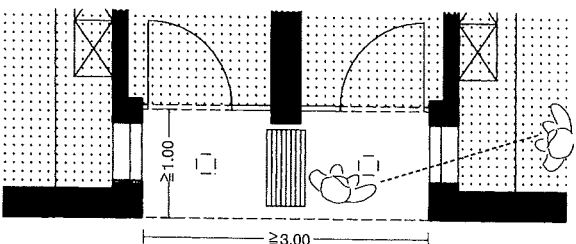


5 Roofed entrance

6 Recessed entrance



7 Two entrances under a common projecting roof



8 Semi-detached houses with common entrance area

Entrance

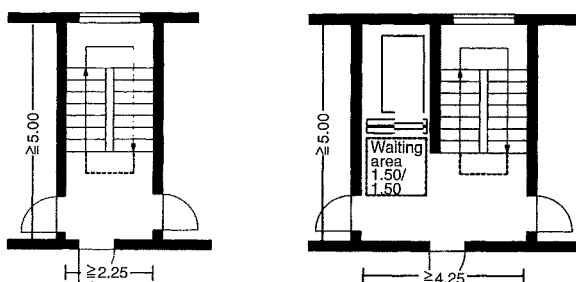
The entrance is the face of a house, where visitors gain their first impression. A multitude of functions have to be practically arranged and appropriately designed → 1. If the entrance is into the open air, it should be protected from the prevailing wind direction if possible. If weather conditions are unfavourable, a lobby is also recommended to prevent wind blowing through → p. 136 (if the entrance is into a stair shaft, then this can provide wind protection).

According to the MBO, front doors of flats which are accessed by lifts must have a clear opening width of **90 cm** (for wheelchair access). The door height in this case should be at least 2.10 m. Door thresholds are to be avoided. The entrance door must also comply with acoustic and fire protection requirements.

Entrance recesses should be at least **1.25 m** (better 1.50 m) wide and approx. **1.00 m** deep, so that two people can wait comfortably and protected in front of the door → 4.

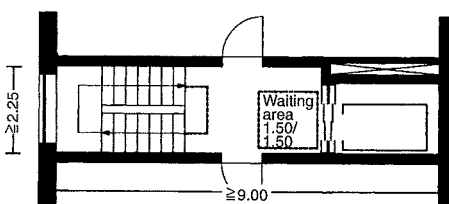
For typical entrance arrangements for single- and multi-family houses and flat entrances see → 5 – 8.

An important element of the entrance to a block of flats is the stair shaft with staircase and lift → p. 128. The layout and size of the lifts determine the dimensions of the waiting area, which should offer enough space for a number of people, wheelchair users or stretcher bearers → 9 – 12.

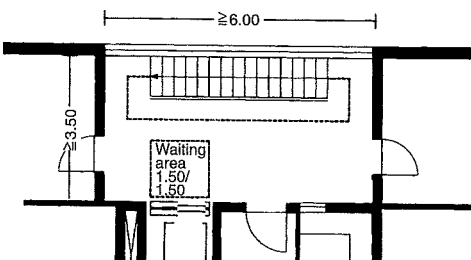


9 Staircase with two-flight stairs; three flats per floor

10 Parallel arrangement of stairs and lift; three flats per floor



11 Opposed arrangement of stairs and lift; two flats per floor



12 Single-flight stairs, displaced arrangement of stairs and lift

ROOMS

Access

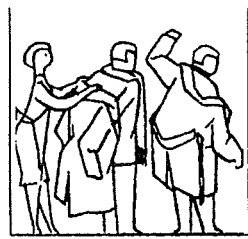
Residential buildings

ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages



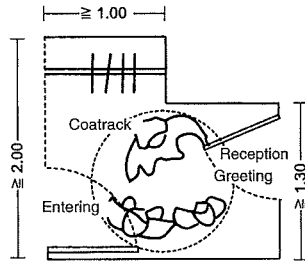
1 Space requirement in the entrance hall for comfortable greeting



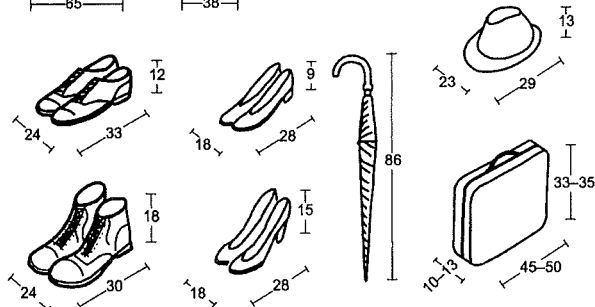
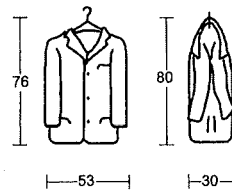
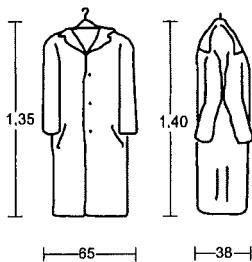
2 For easy removal of coats



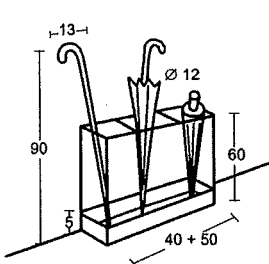
3 Greeting



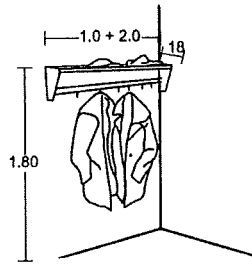
4 Floor plan with movements



5 Dimensions of coats and jackets, umbrellas, hats, briefcases and shoes



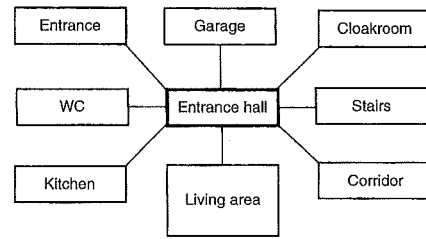
6 Umbrella stand with watertight base, coat rack (six hooks across 1 m)



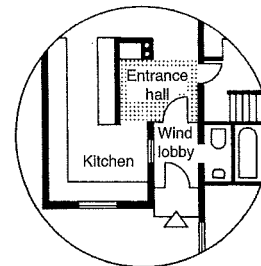
Entrance hall

The entrance hall should be enclosed where the entrance leads directly to the open air with an inner door (wind lobby function). It should also offer sufficient room for a lot of moving around →

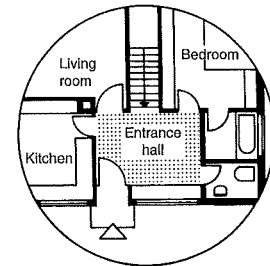
4. This is where **reception, greeting, taking off and putting on coats, and taking leave** all take place, but also offers the first **orientation** for the visitor → 1 – 3. Countless objects therefore have to be arranged practically yet tidily in this limited space → 5, 6. The most important communal areas like the kitchen, WC and staircase should be directly accessible from the entrance hall.



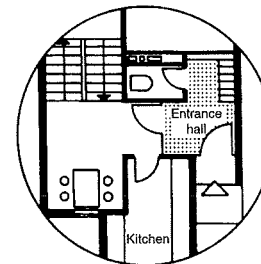
7 Relationship between entrance hall and other areas of the house



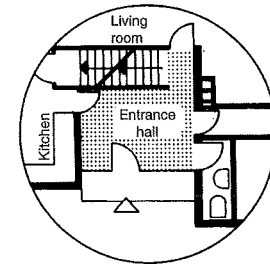
8 In relation to wind lobby



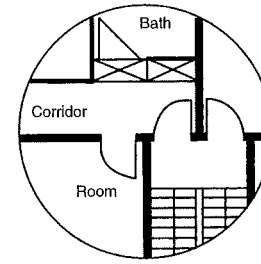
9 In relation to kitchen, WC, cellar stairs and bedroom



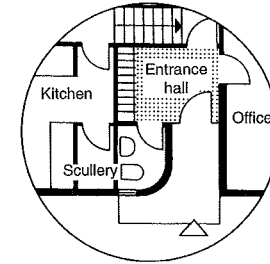
10 Side entrance



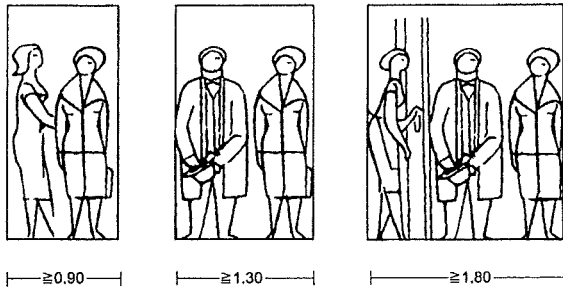
11 In relation to cellar stairs



12 Entrance hall of a maisonette



13 Lobby in relation to office



1 Corridor widths

Residential buildings

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Corridor type	Little traffic	Heavy traffic
doors one side, opening into the rooms	0.90 m	1.30 m
doors both sides, opening into the rooms	1.60 m	
doors one side, opening into the corridor	1.40 m	1.80 m
doors both sides, opening into the corridor		2.20 m
doors both sides and opposite each other, opening into the corridor	2.40 m	2.60 m

2 Minimum corridor widths depending on door arrangement (separate, opposing), opening direction and traffic volume

ROOMS

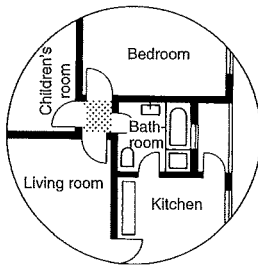
Access

Corridors

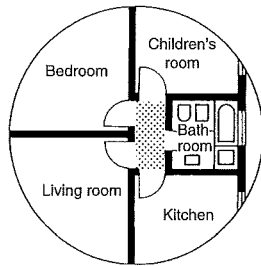
Corridors form the neutral connection between the rooms in a house. Although they do not actually belong to the living area, they should be laid out generously and be as spatially varied as possible. Partial opening to living areas and natural lighting is desirable. Adjacent rooms often seem roomier next to a more generous corridor, because of the better arrangement of doors to bedrooms and cupboards → 5.

Corridor widths

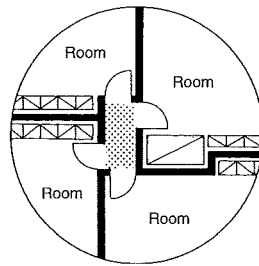
The width of a corridor depends on its location, the number and arrangement of the doors opening off it (doors one side, both sides) and the number of people using it → 2. The greatest accessibility offered by various sizes and layouts of corridors to rooms more than 2 m wide is shown in → 3 – 14. The examples assume a minimum corridor width of 1 m, which allows two people to pass. This width does not, however, permit the siting of cupboards, which would be better built-in → 6 + 9. When arranging the doors, the location of beds and built-in cupboards needs to be taken into account (see above).



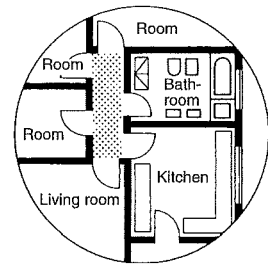
3 1 m² corridor: as the node between four rooms



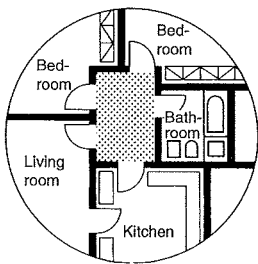
4 2 m² corridor: four rooms, otherwise as 3



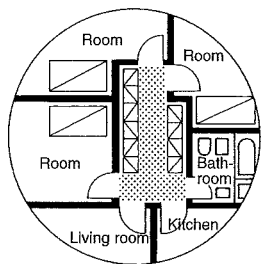
9 2 m² corridor: four rooms with built-in cupboards and beds



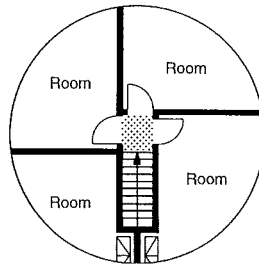
10 3 m² corridor: six rooms



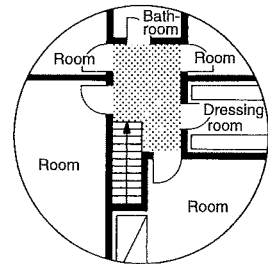
5 4 m² corridor: five rooms and built-in cupboards



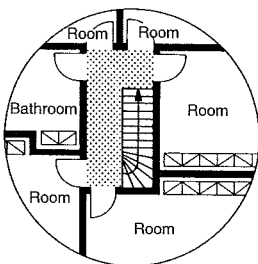
6 5.2 m² corridor: six rooms with some built-in cupboards and beds



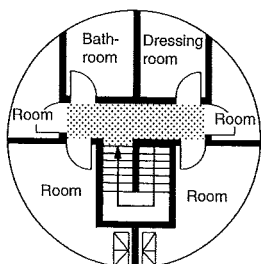
11 1 m² corridor: three large rooms at the end of a flight of stairs



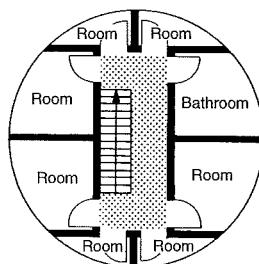
12 5 m² corridor: four large and two small rooms (bathroom, changing room)



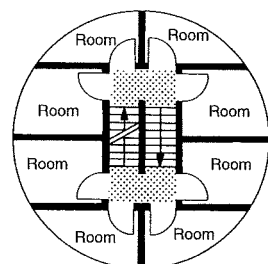
7 5 m² corridor: five rooms and one bathroom



8 4 m² corridor: four rooms, one bathroom and one dressing room



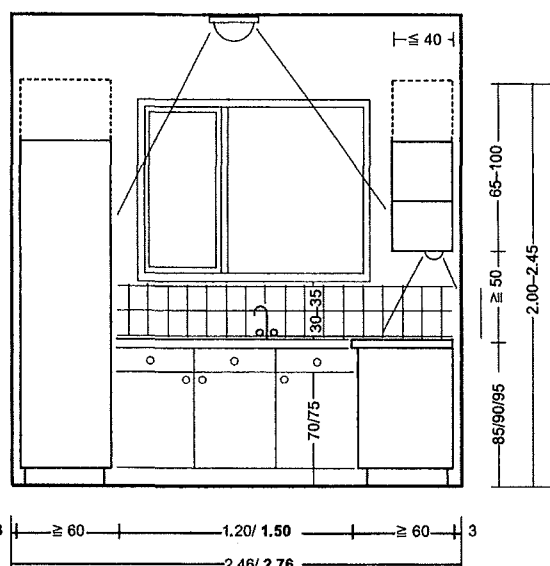
13 7 m² corridor: eight rooms with single-flight stairs



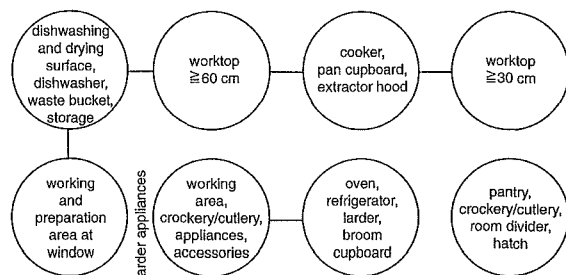
14 4 m² corridor: eight rooms with floors on different levels

ROOMS

Kitchens



1 Dimensional requirements for kitchens



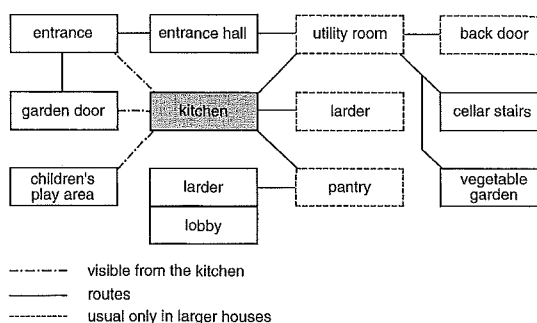
2 Practical arrangement of working areas in the kitchen

The **kitchen** is a workplace inside the home and at the same time an important living room and meeting point for the occupants and their guests, with various relationships to other areas of the house. According to the building regulations, **every house or flat must have at least one kitchen or kitchenette for cooking.**

Kitchens and kitchenettes without windows are generally undesirable and only permissible if effective ventilation is guaranteed. As a habitable room, the kitchen must have a clear ceiling height of at least 2.40 m and a window area (structural dimensions) of at least 1/8 of the net floor area.

Location

The location of the kitchen is ideally on the northeast or northwest, in the immediate vicinity of the entrance area (short distances for shopping, rubbish etc.), to the (vegetable) garden and the cellar. There should be sensible **internal room relationships** with the dining room, utility room and larder. It should ideally be possible to see the front door, children's play area and terrace from the kitchen → 4.



4 Room relationships of a larger kitchen

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BS EN 1116
BS 6222
BS EN 60335
BS EN 14749
DIN EN 1116

MBO

see also:
Accessible
building p. 21

Unit or appliance	Space required	
	Width (cm)	Depth (cm)
Cupboards for crockery/cutlery, foodstuffs etc.		
1 base unit cupboard	30-150	60
2 broom cupboard	60	60
3 wall cupboard	30-150	≤40
Cooling and freezing appliances		
4 refrigerator	60	60
5 freezer	60	60
6 chest freezer	≥90	acc. to maker
Worktops		
7 small worktop between cooker and sink	≥60	60
8 large worktop	≥120	60
9 surface to set down appliances	≥60	60
10 worktop next to cooker	≥30	60
11 worktop next to sink	≥60	60
Cooking appliances		
12 cooker with oven and extractor hood	60	60
13 built-in cooker with base unit	60-90	60
14 built-in oven with base unit	60	60
15 microwave oven	60	60
Washing-up equipment		
16 single-basin sink with draining board	≥90	60
17 double-basin sink with draining board	≥120	60
18 dishwasher	60	60
19 washing-up unit (single-basin sink with draining board, base unit and dishwasher)	≥90	60

3 Dimensions of kitchen units and appliances

Coordinated dimensions for kitchen furniture are provided in → 3. The dimensions given here do not take into account the movement areas of the elderly or disabled so are to be considered absolute minimum values. In general, the design of kitchens should be based on **movement areas for accessible housing** → p. 21 ff.

The planning of a kitchen should make possible a **flowing work sequence** with sufficient space for movement, while avoiding unnecessarily long distances. A movement area of **1.50 m** (min. 1.20 m) is therefore required between the stretches of worktop. With most kitchen units having a depth of 60 cm on each side of the movement area, this results in a minimum kitchen width of **2.70 m** (min 2.40 m) (plus approx. 6 cm spacing up to the wall).

The **height of the worktops** should if possible be adapted to suit the height of the user and can vary between 85 and 95 cm → 1. Working while standing should be minimised through the provision of (slide-out) worktops.

Good posture while working in the kitchen and good lighting in the work area are general requirements → p. 154. In order to make the work in the kitchen easier, a **practical arrangement of work areas** is desirable → 2.

ROOMS

Kitchens

Residential buildings

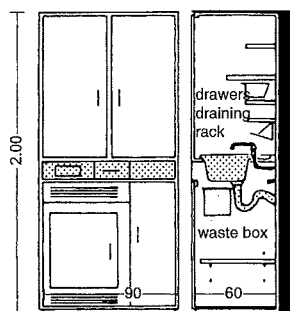
ROOMS

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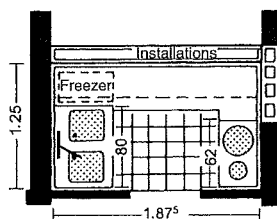
BS EN 1116
BS 6222
BS EN 60335
BS EN 14749
DIN EN 1116

MBO

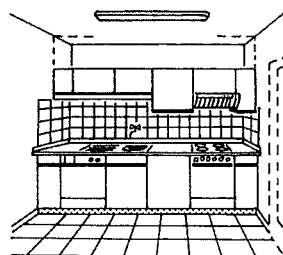
see also:
Accessible
building p. 21



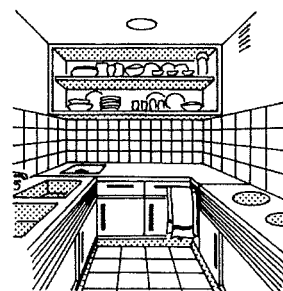
1 One-unit ('cupboard') kitchen (Fa. Haas und Sohn)



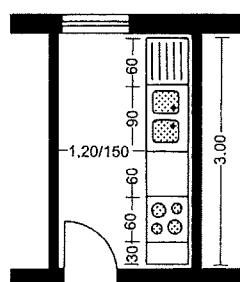
2 Very small kitchen with internal ventilation and extraction Arch.: Neufert



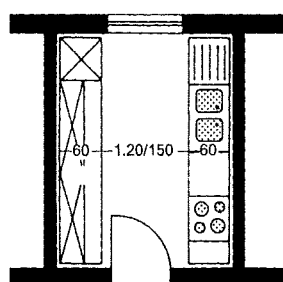
3 Perspective view → 5



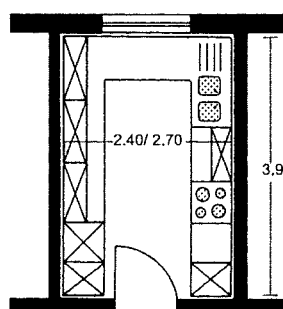
4 Perspective view → 2



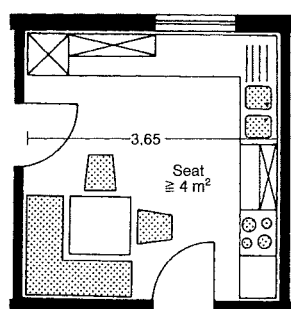
5 Galley (single-row) kitchen



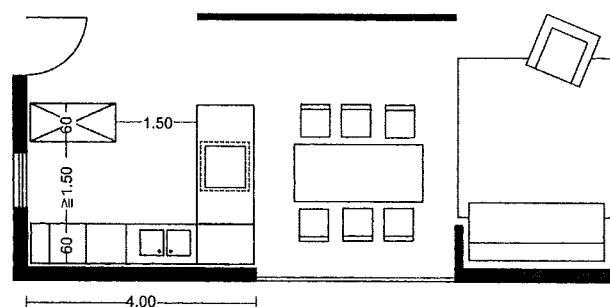
6 Galley (two-row) kitchen



7 U-shaped kitchen



8 L-shaped kitchen with dining area



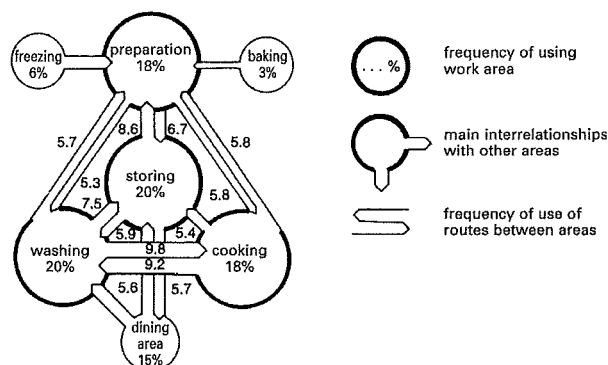
9 Open kitchen continuous with the room

Kitchen types

The kitchen types shown here are produced from the requisite kitchen arrangements and their floor areas. The basic types are:

Compact kitchens or kitchenettes: These are only adequate for housekeeping requirements to a limited extent (scarcely any shelf or cupboard space) and are really only suitable for holiday flats and (student) apartments. Kitchenettes do not normally require their own room and can be sited in passages or corridors → 1 – 2.

Kitchen as working room: The kitchen equipment is functionally arranged in the smallest possible area as a **one-row, two-row** or **U-shaped** configuration, normally as a fitted kitchen. The location of the appliances and worktops are optimised for rational working → 3. This results in practical working spaces on a floor area of between 5.5 m² and 9.5 m² (though not suitable for purposes other than kitchen work) → 5 – 7. The connection to the dining area is via the corridor or hall and can be supported with hatches etc.



10 Practical arrangement of working space in the kitchen

Kitchen with dining area

The kitchen with dining area offers, in addition to the actual kitchen fittings, space for a table with chairs or benches, to be used as an additional dining area (breakfast area). The kitchen thus becomes a lived-in room, providing improved opportunities for conversation. Kitchens with dining areas can be planned from approx. 10 m². A good arrangement is an L shape with doors connecting to the living room and corridor: area approx. 14 m² → 8.

A parallel development to the kitchen with dining area is the **'open' kitchen**, where the kitchen area is open to the living room and dining area. This can be designed as an 'American fitted kitchen', a functional area connected to the living room, with for example a kitchen breakfast/snack bar as divider → p. 154 9.

Modern kitchen designs are moving away from the fitted kitchen. The kitchen area is seen as an ensemble of independent objects developed in each case from formal and functional conditions, which are grouped like pieces of furniture in an (ideally generous) residential room. Open kitchens require good ventilation and extraction in order not to impair the living and dining room areas with cooking smells. In many cases, a mobile divider is to be recommended, for example using a curtain → 9.

ROOMS

Kitchens

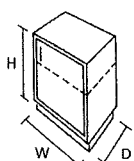
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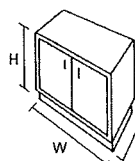
BS EN 1116
BS 6222
BS EN 60335
BS EN 14749
DIN EN 1116

H(cm) × W(cm) × D(cm)
85 20–60 60



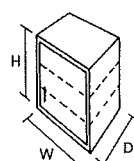
1 Single base unit

H(cm) × W(cm) × D(cm)
85 70–150 60



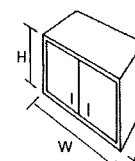
2 Double base unit

H(cm) × W(cm) × D(cm)
35 20–120 35
65 100

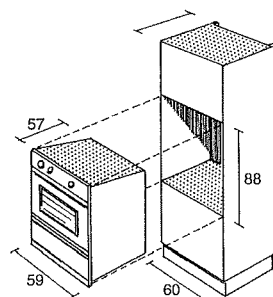


3 Single wall unit

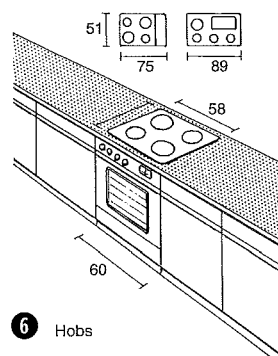
H(cm) × W(cm) × D(cm)
50 70–150 35
65 100



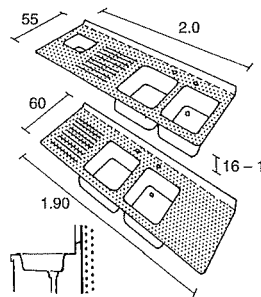
4 Double wall unit



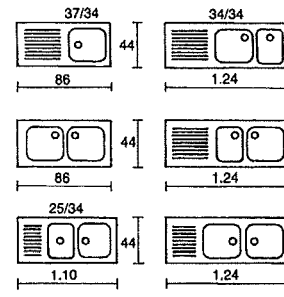
5 Built-in oven



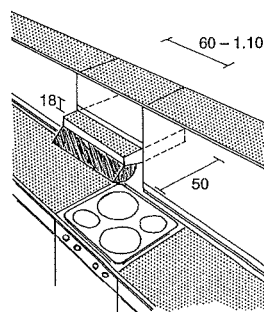
6 Hobs



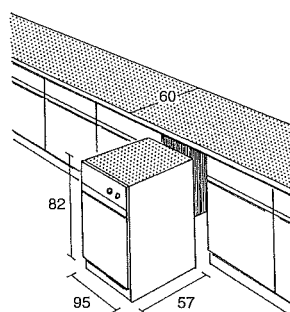
11 Sizes of built-in sinks



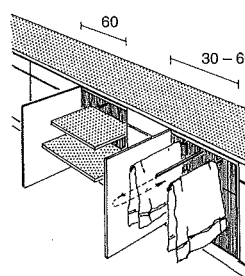
12 Built-in sinks



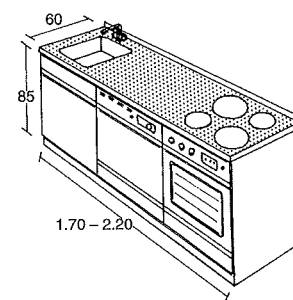
7 Extractor hood



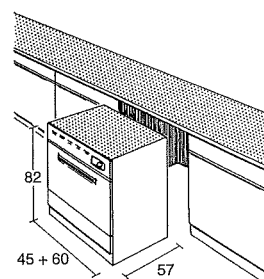
8 Electric waste compactor



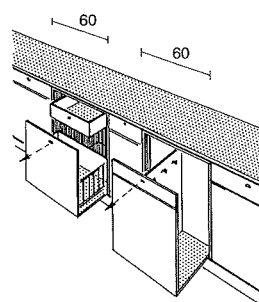
13 Small appliance and drying cupboard



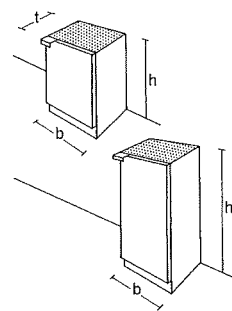
14 Kitchen: central elements



9 Dishwasher



10 Pots and pans cupboard



15 Refrigerators

Refrigerators

vol. (l)	w (cm)	d (cm)	h (cm)
50	55	55–60	80–85
75	55	60–65	85
100	55–60	60–65	85
125	55–60	65–70	90–100
150	60–65	65–70	120–130
200	65–75	70–75	130–140
250	70–80	70–75	140–150

Built-in refrigerators

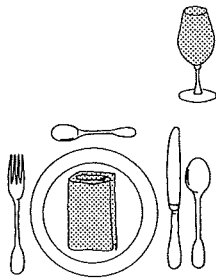
vol. (l)	w (cm)	d (cm)	h (cm)
50	55	50–55	80–85
75	55	55–60	85–90
100	55	60–65	90

16 Dimensions → 15

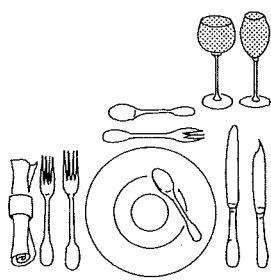
Kitchen fittings

Numerous modular systems with fixed functions and dimensions are available for fitting kitchens, mostly arranged along continuous worktops. Types of kitchen unit and appliances:

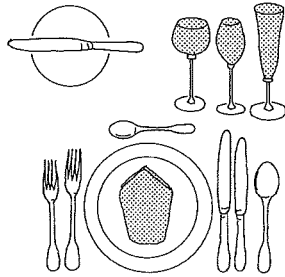
- **base unit** with large drawers or cupboards for provisions, large pots and pans and as shell for built-in appliances → 1 – 2.
- **wall cupboards** for provisions and equipment or for lightweight appliances (e.g. microwave) → 3 – 4.
- **tall cupboards** with a height of approx. 2 m, to store provisions, as a broom cupboard or as a shell for the installation of fridge, oven etc.
- **cooker with extractor hood** with 2–4 rings, electric or gas, often split into an oven built into a tall unit and a hob built into the worktop → 5 – 7.
- **sinks**, normally built into the worktop with 1–2 sinks and an integrated draining board → 11 – 12.
- the base unit under the sink generally houses a **dishwasher** → 9 and also a waste bin
- the **refrigerator** is housed under the worktop (in smaller kitchens) or integrated into a tall cupboard at standing height, with **freezer compartment**, separate **freezer** or in combination with a **chest freezer** → 15 – 16.



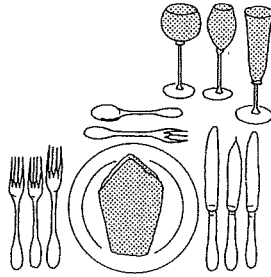
1 Place setting for meal: soup, meat dish, dessert, drink



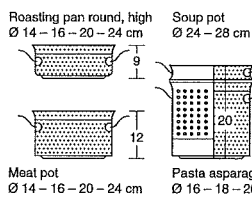
2 Place setting for meal: soup, fish and meat dishes, dessert, white and red wine



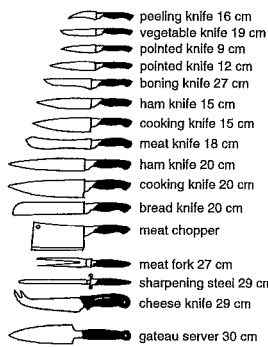
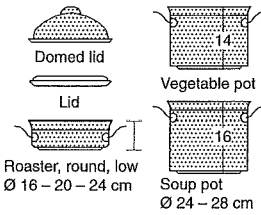
3 Place setting for meal: soup, fish and meat dishes, ice cream, sparkling, white and red wine



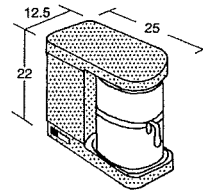
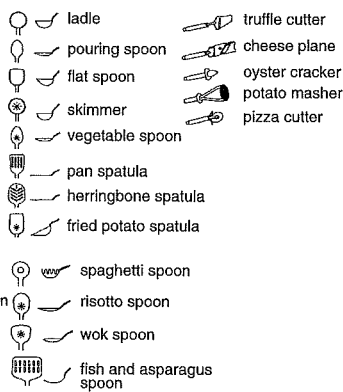
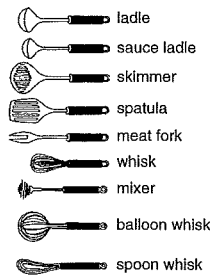
4 Place setting for meal: starter, fish and meat dishes, dessert, sparkling, white and red wine



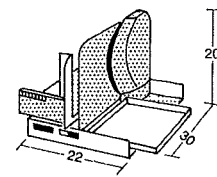
5 Stackable pans



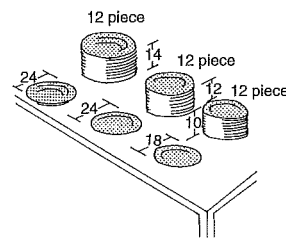
6 Kitchen utensils



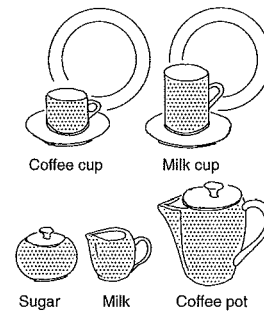
7 Coffee machine



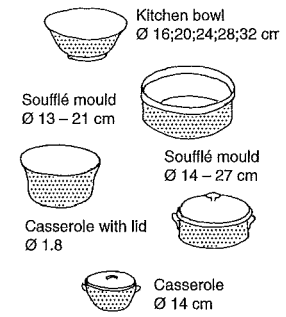
9 Multipurpose slicer; kneading, rolling and slicing boards



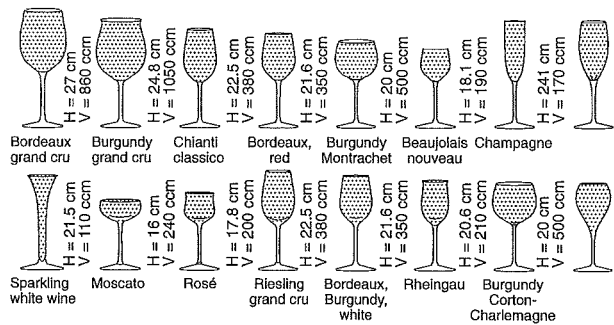
8 Plates



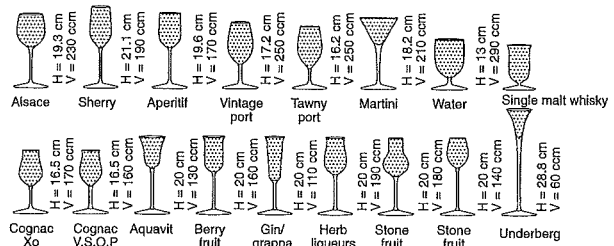
10 Tea and coffee set



11 Dishes



12 Wine and spirit glasses



ROOMS

Kitchens

Residential buildings

ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages

BS EN 1116
BS 6222
BS EN 60335
BS EN 14749
DIN EN 1116

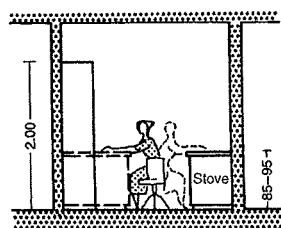
Working processes

The layout of a kitchen should enable rational and time-saving working. In addition to a suitable arrangement of appliances, shelves and worktops → p. 149, working processes can also be optimised and accelerated with opposing worktops → ①. The kitchen can also be used by two people at the same time in the same area if the worktops and appliances are appropriately arranged → ②.

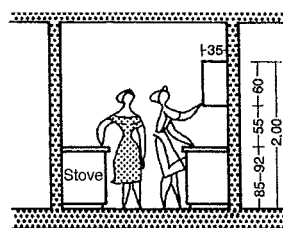
High cupboards and shelves should be suitably positioned relative to the working areas and should be comfortable to reach → ③ – ④. Worktops placed at the correct height for the relevant activity can make kitchen work considerably easier → ⑧.

Kitchens are frequently used areas of the house and should be comfortable and easy to clean → ⑫. It is a good idea to set window sills at a suitable height above the worktop so that windows can be opened without having to clear the worktop → ⑬.

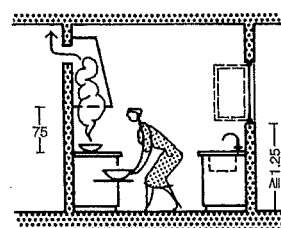
The lighting should include lights fixed under the wall cupboards → ⑦. The arrangement of switches and sockets and the additional space required for installations built into cladding, radiators and their pipework should be taken into account in the planning and spacing of the worktops.



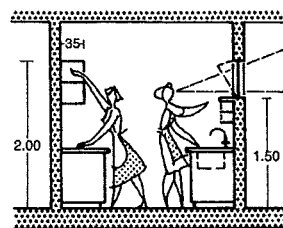
① Section through kitchen with two workplaces



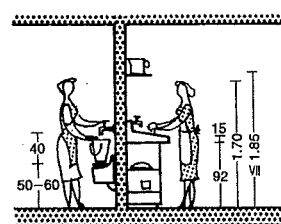
② Section through kitchen with room for two people



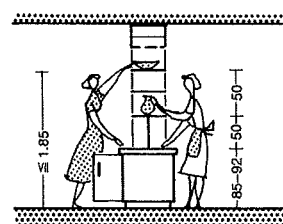
③ Low-level ovens require appropriate room for movement; provide an extractor fan above the cooker



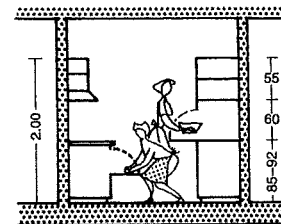
④ Worktops 60 cm deep



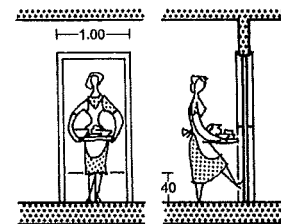
⑤ Normal height for bucket sinks and the maximum height for sinks with usable high-level shelf



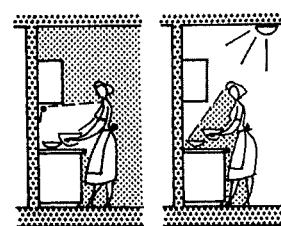
⑥ Reach-through hatch between kitchen and dining area with shelves for crockery at higher level; can be opened from either side



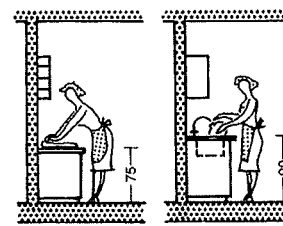
⑪ Adjacent working



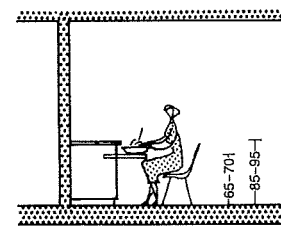
⑫ The best height for a metal plate to enable a door to be kicked open between pantry and dining room



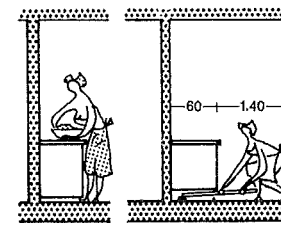
⑦ Correct and incorrect kitchen lighting



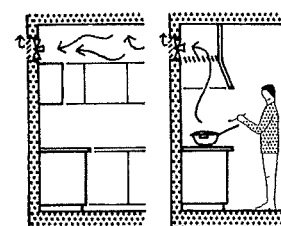
⑧ Normal table height of 85 cm lies between the best height for breadmaking and the sink



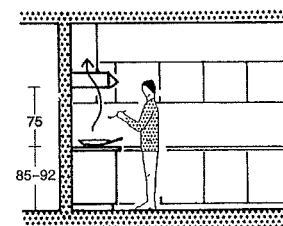
⑬ Pull-out worktop intended for seated working



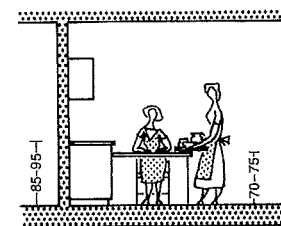
⑭ Correct installation of cupboard base for comfortable cleaning and working ≥10 cm



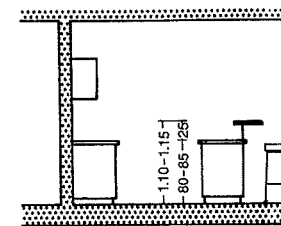
⑨ Artificial ventilation with a fan (A) or extractor hood (B)



⑩ Extractor fan above cooker



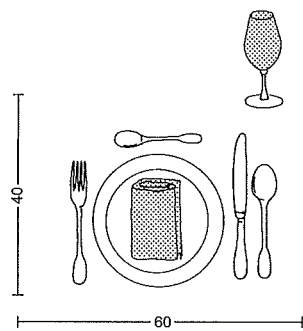
⑮ Slide-out, swivelling table



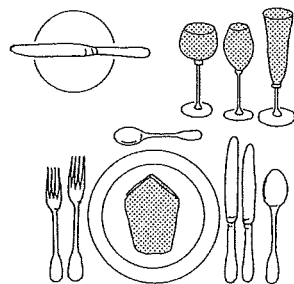
⑯ At the breakfast/snack bar

ROOMS

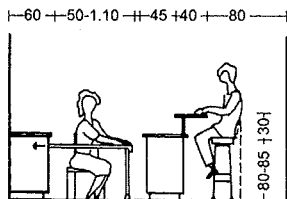
Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages



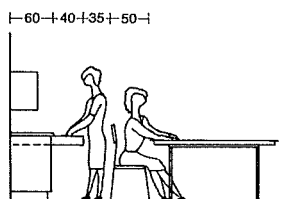
1 Place setting for: soup, fish dish, dessert, drink



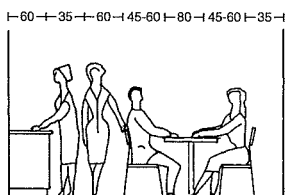
2 Place setting for: soup, fish and meat dish, ice cream, sparkling, white and red wine



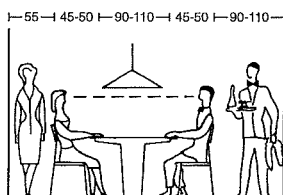
3 Pull-out table and kitchen bar with bar stools



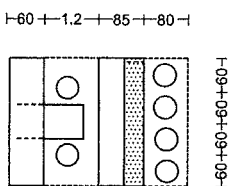
4 Space for drawers and doors



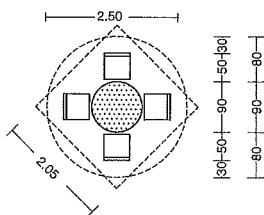
5 Space between sideboards and tables



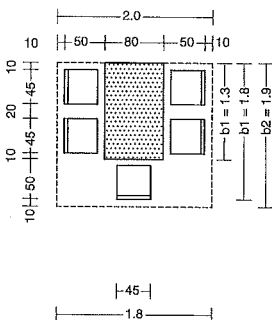
6 Minimum distance of table from wall



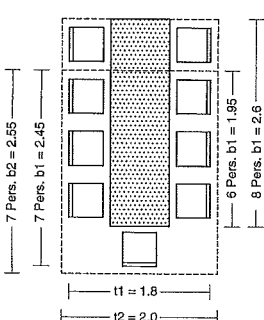
7 Kitchen bar, plan → 3



8 Round table, 4-6 people



9 Minimum space required for snack and dining areas (five people)



10 Minimum space required for snack and dining areas (nine people)

Dining rooms

Dining rooms fulfil communication, social and prestige functions. They form a central part of the (communal) life within a home. The spectrum ranges from a breakfast/snack bar in the kitchen to the occupants of the house taking meals together to dining with guests (in a separate dining room). The requirements for the design and spatial layout of the dining areas are correspondingly varied. The dining table may well be considered the central point of organisation in the home → p. 150 9.

Minimum requirements

The dining area should be laid out to accommodate the anticipated size of the household. It should always offer space for at least 4 people.

Spatial layout

Dining areas are normally oriented to the south or west. A direct connection to the kitchen (or pantry) is practical. It is good to provide for extension (with sliding partitions etc.) for special events. Dining areas should have access to the balcony or terrace if possible.

If a separate breakfast area is desired, this is best placed to the south or east of the house. If it is sited in the kitchen, it will require additional storage and movement areas.

Equipment and space requirements

In order to be able to eat comfortably, a person needs a table area of approx. 60 × 40 cm → 1. This results in sufficient distance from a neighbour and room for a complete place setting. The centre of the table should have a 20 cm strip for plates, pots and bowls.

A snack area can be formed from a pull-out table with a height of 70-75 cm → 3. If there is room, a folding table fixed to a free-standing cupboard is a good solution. A movement area of 80 cm is required to the left and right of the table.

A space-saving kitchen bar also has a depth of 40 cm, but needs less space because of the projection of 15 cm. Special bar stools or chairs are needed in this case → 3 + 7. A dining area in the kitchen needs an amount of space according to the layout, but can often replace a dining room.

A comfortable round dining table has a diameter of min. 0.90 m, though 1.10-1.25 m would be preferable.

A corner bench with table takes up less space than any other dining area layout. If more than three people are to be accommodated, the movement area increases by 80 cm per seating place. Dining table lighting should avoid glare.

large dining room for	6-24 people
width of table	55-110 cm
width of places	55-70 cm
additional for head of table places	10-20 cm
$\cong \text{round table} = \frac{\text{place width} \times \text{no. people}}{3.14}$	
e.g. for 60 cm place width and 6 people	
$= \frac{60 \times 6}{3.14} = 1.04 \text{ m}$	

Tables and chairs for	Width (cm)		Depth (cm)		Area (m ²)	
	w1	w2	d1	d2	A1	A2
4 people	130	—	180	200	2.34	2.6
5 people	180	190	180	200	3.24	3.8
6 people	195	—	180	200	3.51	3.9
7 people	245	255	180	200	4.41	5.1
8 people	260	—	180	200	4.68	5.2

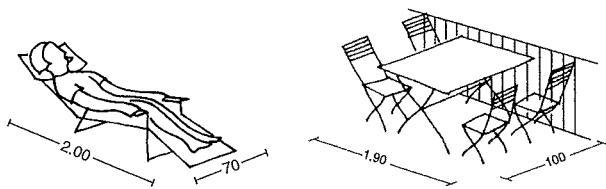
w1, d1, A1 without space for pulling out chair
w2, d2, A2 with space for pulling out chair

11 Minimum space required for snack and dining areas (4-8 people)

12 Minimum table sizes according to number of people

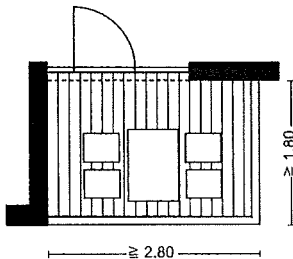
ROOMS

Living Areas

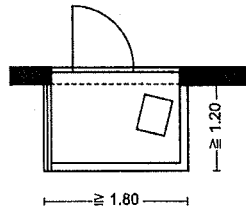


1 Reclining chair

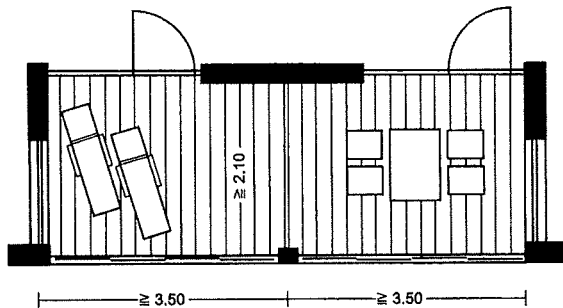
2 Garden table



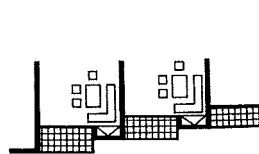
3 Corner balcony



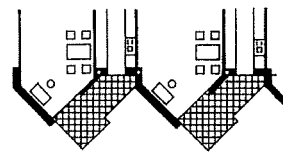
4 Open balcony



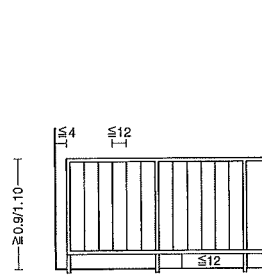
5 Recessed balcony (loggia)



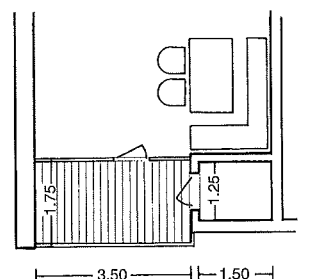
6 Balconies offset by stepping



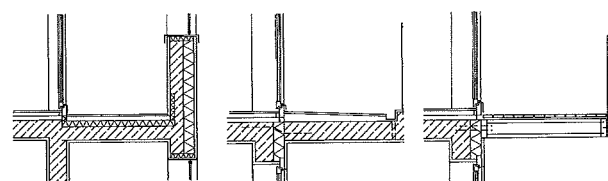
7 Balconies with angular offset



8 Dimensions of railings



9 Balcony adjacent to interior dining area



10 Possible structural details for balconies

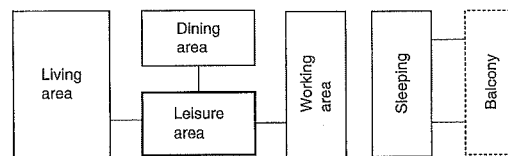
Open-air areas

The attractiveness of housing can be considerably enhanced through open-air areas (balconies, loggias and terraces) adjoining the rooms. In the summer these offer a desirable extension of living space for relaxing, lounging, sleeping, reading and eating, and can also offer an extended working area or an easily supervised open-air play area for children. Balconies, loggias and terraces are a part of the living areas, for which they are normally calculated as 25–50% → housing area regulation, p. 136.

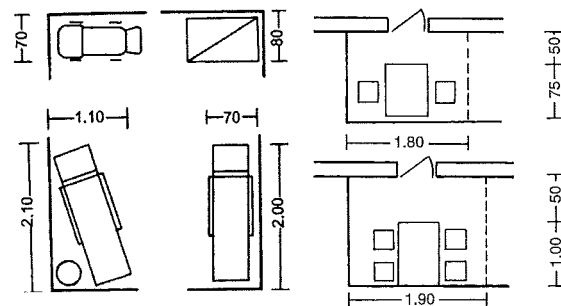
They generally have a spatial relationship to living and working areas and dining rooms (with more than one open area, this can also include bedrooms, kitchens etc.). Good orientation (compass direction, view), sufficient size and protection from overlooking, noise and weather (wind, rain, strong sunshine) are decisive for the quality of open areas.

The space required for the parapet (and its planting) has to be included in the functionally required depth.

Corner balconies → 3 offer privacy and wind protection, and are more comfortable than open balconies → 4. Open balconies should therefore be protected on the weather side. Recessed balconies (loggias) → 5 enlarge the external wall area of the adjoining rooms (causing heat loss) but offer the nearest to an 'open-air room'. From plan stage, offset balconies provide excellent protection against overlooking and wind → 6 – 7.

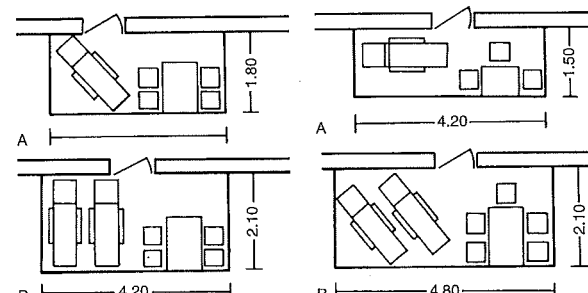


11 Possible relationships of rooms to open areas



12 Pram, reclining chairs

13 Sitting group with table



14 A = 7.0 m² balcony for 3–4 people
B = 9.0 m² balcony for 5–6 people

15 A = 6.0 m² balcony for 1–2 people
B = 10 m² balcony for 3–4 people

Residential buildings

ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages

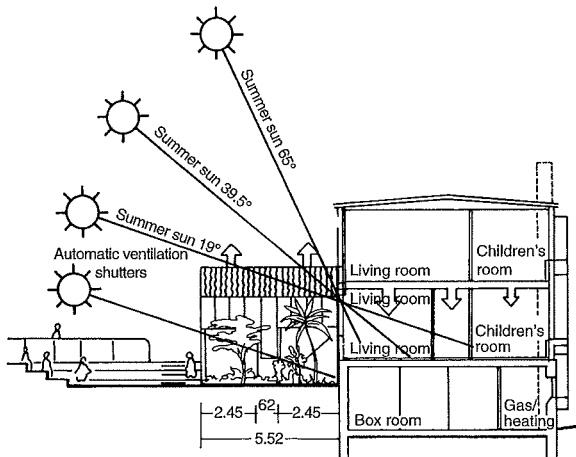
ROOMS

Living Areas

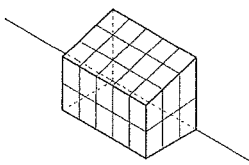
Residential buildings

ROOMS

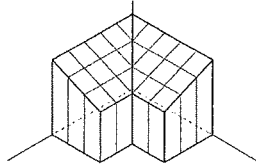
Access
Kitchens
Living areas
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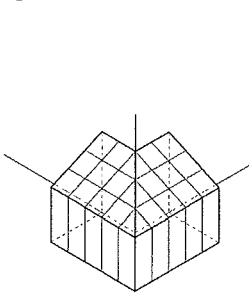
1 Solar town house, conservatory on two storeys → 12 + 13 Arch.: Planungsteam LOG



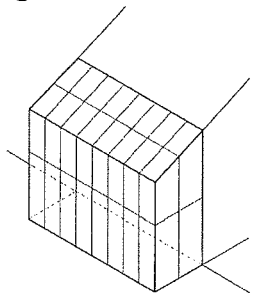
2 Projecting conservatory



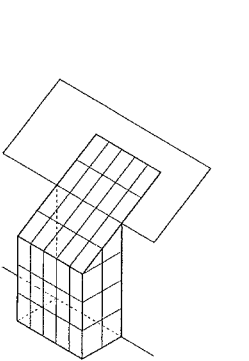
3 Corner conservatory



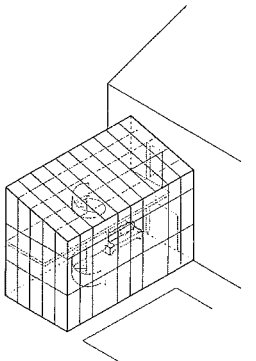
4 External corner conservatory



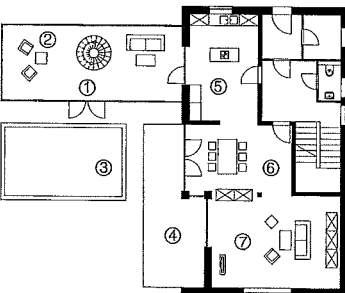
5 Conservatory covering entire building width



6 Recessed conservatory



7 Transverse projecting conservatory



8 Plan → 7

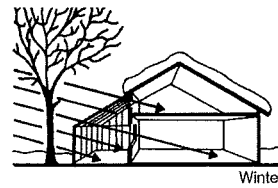
Arch.: Heim + Müller Architektur GmbH

Plan
1 Conservatory
2 Gallery
3 Swimming pool
4 Terrace
5 Kitchen
6 Dining room
7 Living room

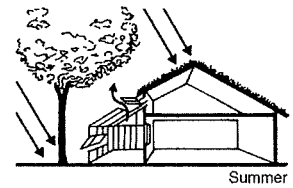
Conservatories

Conservatories project from living rooms with their large glazing areas. Originally they were heated by sunshine, naturally ventilated → 10 – 11 and served as climatic buffer zones and to preserve plants in the cold part of the year.

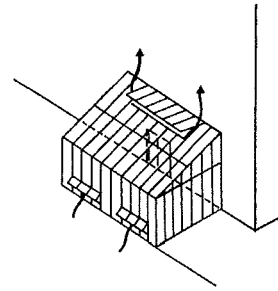
Nowadays conservatories are mostly seen as an extension of living space, and used particularly in the spring and autumn. If equipped with appropriate additional heating and automatic ventilation, they can accommodate sub-tropical plants. In many cases they are part of the heated building volume with corresponding requirements for their outer envelope.



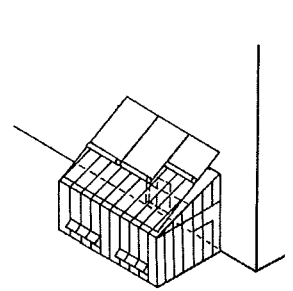
9 Natural shade



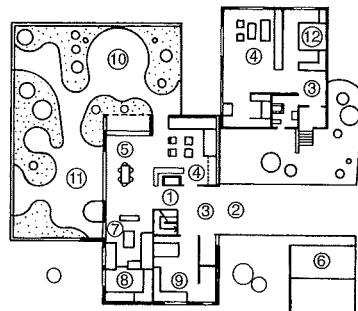
Summer



10 Ventilation and extraction

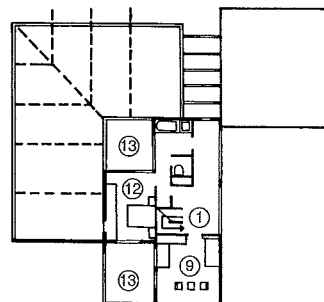


11 External sun shades



12 Ground floor of solar town house → 1 + 13

Plans
1 Corridor
2 Wind lobby
3 Hall
4 Living room
5 Dining room
6 Double garage
7 Kitchen
8 Utility room
9 Children's room
10 Energy greenhouse
11 Storage surface
12 Bedroom
13 Balcony



13 First floor → 1 + 12 Arch.: Planungsteam LOG

ROOMS

Living Areas

Residential buildings

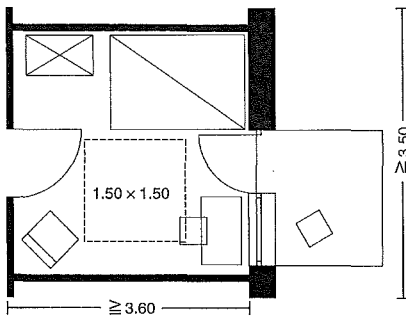
ROOMS

Access
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Garages

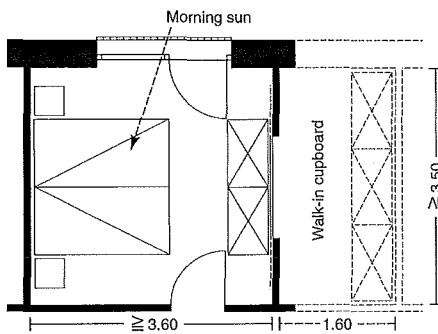
BS 8300
DD 266
DIN 18025

MBO

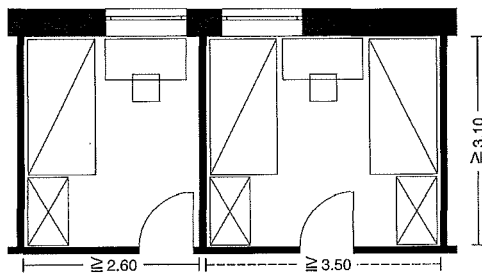
see also: Design
basics p.135



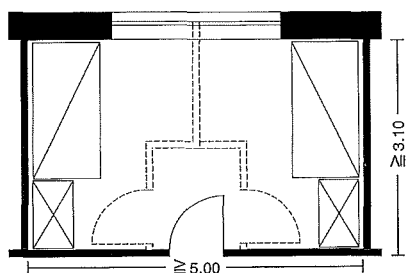
1 Flexibly functional individual room (movement area suitable for a wheelchair)



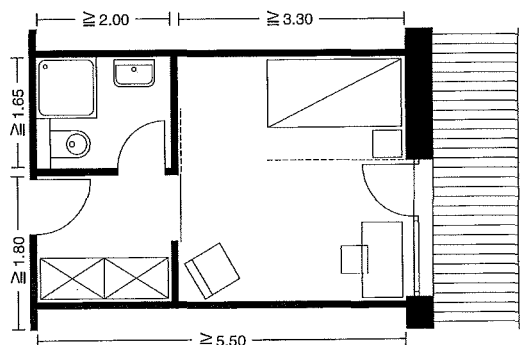
2 (Parents') bedroom with walk-in cupboard extension



3 Small bedroom and small twin bedroom



4 Twin bedroom (can be partitioned)



5 Small individual area with shower room and cupboard zone

Living areas are categorised into those with shared rooms (living and dining rooms, kitchens) and individual (private) rooms for one or two people (parents' (bed)room, children's room, guest room). This differentiation leads to the conventional room layouts, particularly in commercial house building.

But the way living areas are actually used is much more complex and varied. Bedrooms today are often used for **work, play and relaxation** and thus have some of the functions of shared rooms. This makes the fitting out of an individual room within a house as a small **apartment** worth considering.

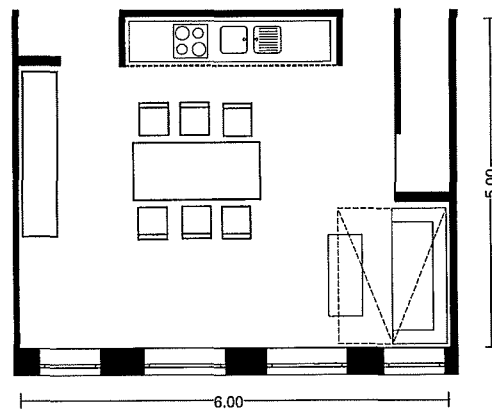
→ 1: an individual room which can be used for a flexible range of functions. It has an area of approx. 13 m², including movement areas suitable for a wheelchair and possible extension onto an open balcony.

→ 2 – 3: bedrooms with **minimal** space of approx. 13 m² (as parents' room or twin bedroom) and approx. 8 m² (single room). These would normally be aligned to east or southeast (parents) or south to west (children) and separated from the living room in another part of the home.

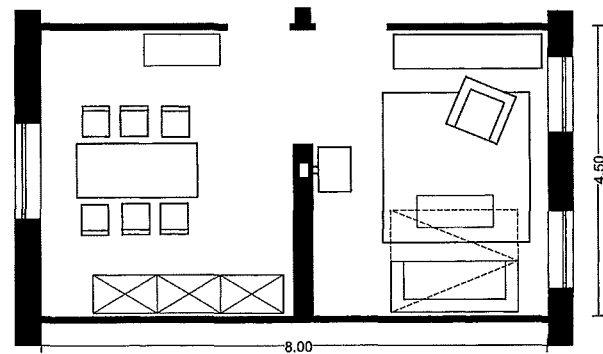
→ 4: the options for a generous twin bedroom of 16.5 m², which could be partitioned (for example, for children as they grow up).

→ 5: a small, independent individual area with shower room and separate cupboard zone.

The conventional **living room** as a shared residential room and prestigious face of the house for visitors is increasingly developing into a multi-functional **communications zone**, which has to serve the needs of residents, but also guests and visitors → 6 – 7.



6 All-purpose room with cloakroom, kitchen, and eating and living areas



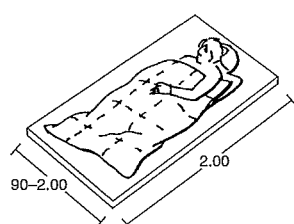
7 Classic living room with dining area

ROOMS

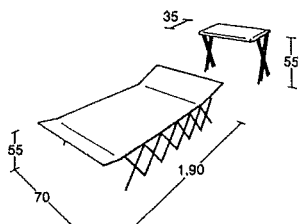
Living Areas

Residential buildings

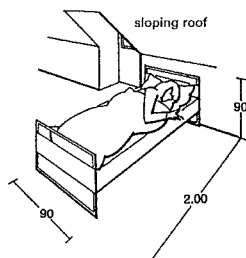
ROOMS
Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages



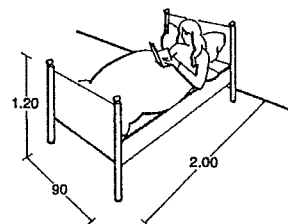
1 Sheepskin roll-up futon, the Japanese form of bed



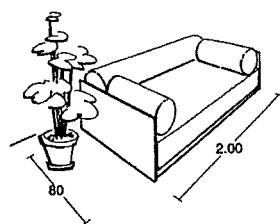
2 Camp bed with canvas cover, can be folded up and used as a bench



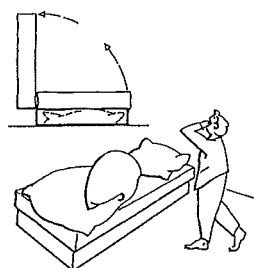
3 Low-level steel tubular bed with quilt or woollen blankets



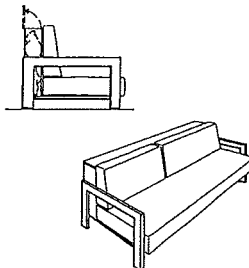
4 Classic wooden bed with footboard and headboard



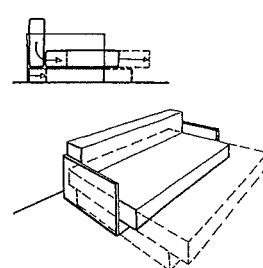
5 Sofa bed: duvet and pillows can be rolled up during the daytime and zipped into the covers



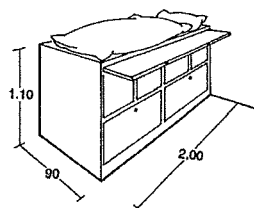
6 As before, but with compartment under the mattress to store the bedding during the day



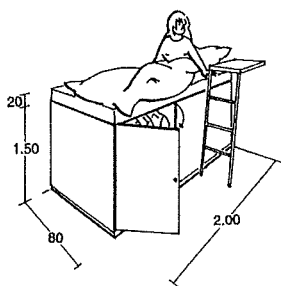
7 Sofa with divan behind the inclined backrests



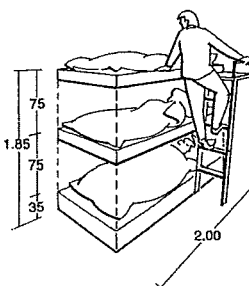
8 Sofa bed with pull-out mattress unit



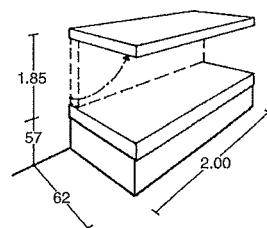
9 High bed with deep drawers and slide-out board on top, with covers



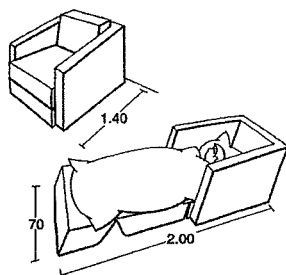
10 Cupboard-bed with low cupboard for clothes, suitable for very small rooms, ship's cabins, studio rooms etc.



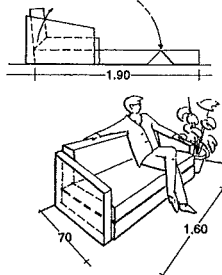
11 Three-level bunks for dormitories, weekend houses and children's rooms, space required 0.338 m² per bed



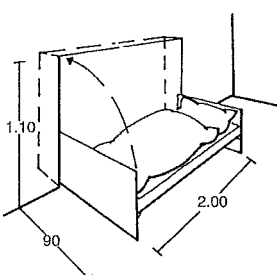
12 Pullman bed for sitting and sleeping in vehicle; backrest folds up to form second bed



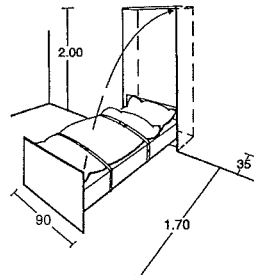
13 Armchair bed (fold-out); separate container required for bedding



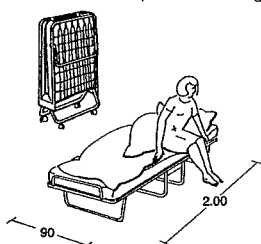
14 Sofa bed (fold-out)



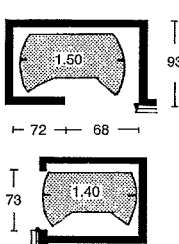
15 Frankfurt bed (folds away sideways)



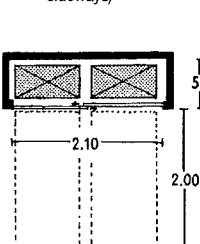
16 Frankfurt bed (folds away vertically), two adjacent or as double bed



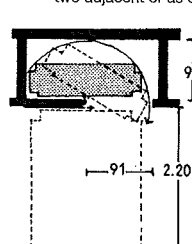
17 Fold-up bed on rollers for one or two people, can be rolled into a cupboard during the daytime



18 Wall cupboard for roller bed with narrow door opening



19 Roller beds can stand in front of closed cupboard door

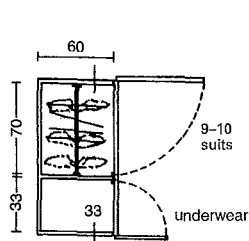
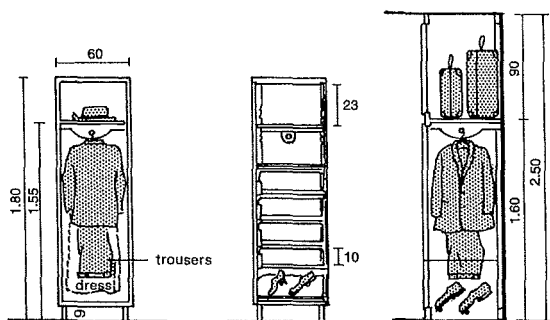


20 With swivelling and folding beds, the wall cupboard stays open at night

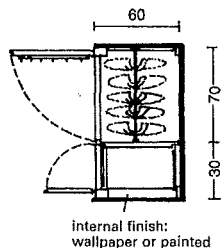
ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages

see also: Store
rooms p. 162



1 Free-standing wardrobe and linen cupboard: plan, sections



2 Built-in wardrobe and linen cupboard with upper compartment
internal finish: wallpaper or painted

Wardrobes and linen cupboards
Contents (example):

For men

- 8 suits
- 6 coats
- 8 jackets
- 12 pairs trousers
- 20 shirts
- 15 T-shirts
- 12 jumpers
- 4 pairs pyjamas
- 8 pairs shoes
- 2 hats

For women

- 6 suits
- 10 coats
- 5 jackets
- 20 dresses
- 15 skirts
- 15 blouses
- 20 tops
- 15 jumpers
- 15 pairs trousers/leggings
- 6 pyjamas/nightdresses
- 10 pairs shoes
- 4 hats

Sundry items

- 6 sheets
- 6 duvet covers
- 12 pillows and cases
- 8 bath towels
- 8 hand towels

Details and fitting out

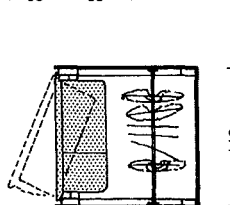
Wardrobes and linen cupboards are an essential part of fitting out a home. They serve to store (larger) items of clothing, linen, shoes and suitcases, and are normally situated in the bedroom.

The essential elements of a wardrobe are a **drawer unit**, a **hanging rail** and additional **shelves**. It can be a **free-standing wardrobe** → 1, a **built-in wardrobe** (wall cupboard, single or double wardrobe constructions) → 2 – 3 or in the form of a walk-in wardrobe or dressing room → 4 – 6.

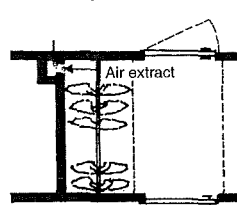
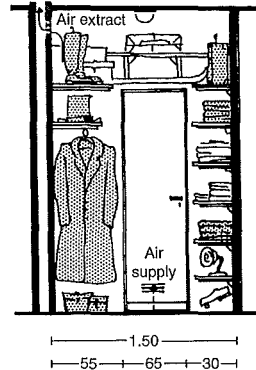
Built-in wardrobe wall units → 5 are useful as partitions between bedrooms. In small rooms space can be optimally used with cupboards built into wall niches → 7 with continuous flooring (and sliding doors).

When determining a house's layout, appropriate space should be planned for. Free-standing (movable) wardrobes are suitable for fitting out rented flats, and built-in wardrobes are often desired in owner-occupied houses and flats.

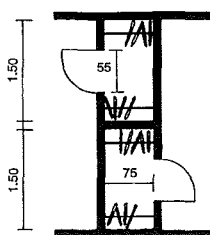
When wardrobes are sited along external walls, care should be taken that the thermal insulation is adequate and that ventilation is provided. Walk-in wardrobes also require appropriate ventilation → 4.



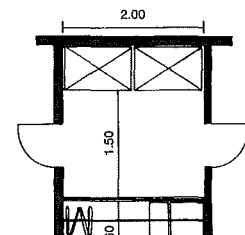
3 Built-in double wardrobe, saving cost and space



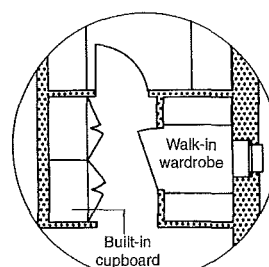
4 Movable wardrobe between two rooms



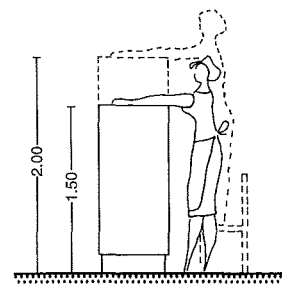
5 Built-in wall units, with wardrobes both sides



6 Wardrobe/dressing room



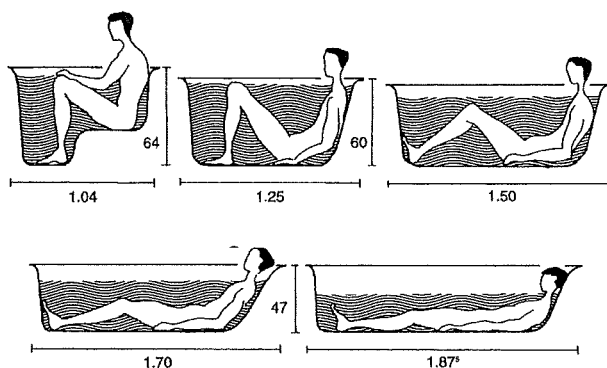
7 Built-in cupboard and walk-in wardrobe



8 Practical heights for free-standing cupboards

ROOMS

Bathrooms



Residential buildings

ROOMS

Access
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Garages

MBO

see also: Sound
insulation p. 477

Warm water required for:	Warm water quantity (l)	Warm water temperature (°C)	Duration of use (approx. min)
full bath	140–160	40	15
sitting bath	40	40	5
footbath	25	40	5
shower	40–75	40	6

1 Bathtubs and warm water requirement. Shorter tubs reduce the quantities (guideline values)

Equipment	Area required	
	Width (cm)	Depth (cm)
Washbasins, hand basins and bidets		
1. single washbasin	≥ 60	≥ 55
2. double washbasin	≥ 120	≥ 55
3. built-in vanity unit with one washbasin and cupboard underneath	≥ 70	≥ 60
4. built-in vanity unit with two washbasins and cupboard underneath	≥ 140	≥ 60
5. hand basin	≥ 45	≥ 35
6. bidet, floor-standing or wall-hanging	40	60
Tubs		
7. bathtub	≥ 170	≥ 75
8. shower tray*	≥ 80	≥ 80*
WCs and urinals		
9. WC with wall installation or pressure flush	40	75
10. WC without cistern (with cistern installed in wall)	40	60
11. urinal	40	40
Laundry equipment		
12. washing machine	40–60	60
13. washer/dryer	60	60
Bathroom furniture		
14. low cupboards, wall cupboards, high cupboards	according to manufacturer	≥ 40

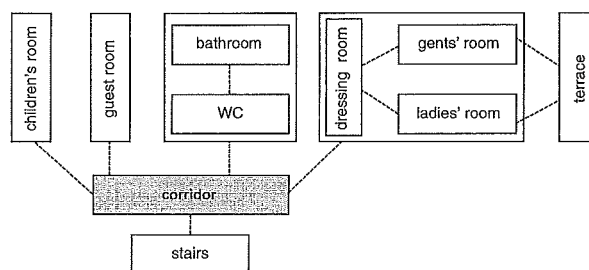
* for shower trays, width = 90 also 75 cm

2 Space required for items in bathroom and WC

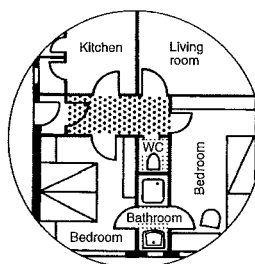
Arrangement	Measurements	MD*	Mi**
	M1	1200	1050
	M2	2100	1900
	M3	1350	1200
	M	450	400
	MM	675	600
	MM1	750	575
	MM2	675	500
	M	450	400
	MM	675	600
	M1	450	400
	MM1	600	525
	M	450	400
	MM	675	600
	M1	450	400
	M2	550	500
	M3	1100	1000
*MD = Average, recommended dimension	M2	750	700
**Mi = Absolute minimum dimension	M3	950	900

3 Centre-line and wall spacing for sanitary fittings

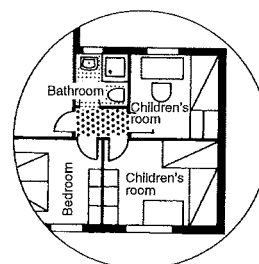
A bathroom is defined as an independent room with **bath/shower** and **toilet** and, according to building regulations, belongs to the **minimum equipment** of a flat or house. In larger houses, bath and WC should be in separate rooms, or an additional WC (guest WC) should be provided. The bathroom should be oriented to the **north**, and if possible have natural ventilation and lighting (otherwise provide effective mechanical ventilation according to DIN 18017-3). The bathroom is normally next to the bedroom → 5 – 6, 8 – 10, although it is also often convenient for technical reasons to place bath and kitchen (or WC and kitchen) on a common installation shaft → 8 – 9.



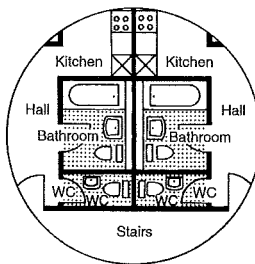
4 Relationships of rooms to the bathroom



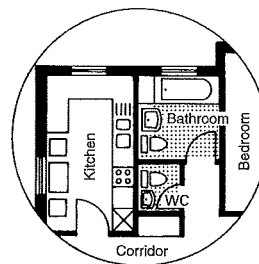
5 Bathroom between the bedrooms, WC accessible from corridor



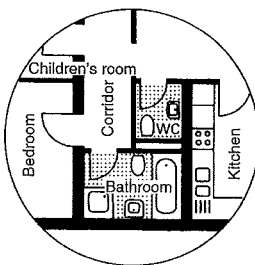
6 Bathroom on corridor between living room and the three bedrooms



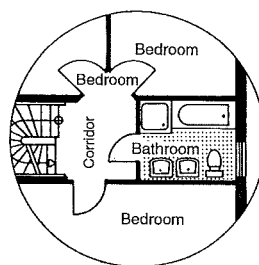
7 Kitchen, bathroom and WC on one installation wall



8 Kitchen, bathroom and WC on one installation wall



9 Bathroom off an internal corridor



10 Typical bathroom in terraced house

ROOMS

Bathrooms

Residential buildings

ROOMS

Access
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see also:
Accessible building p. 21
Sound insulation p. 477

Details and fitting out

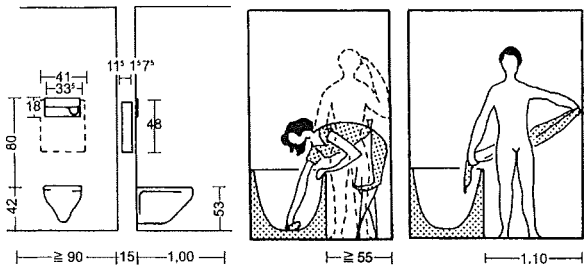
The former standard valid for movement areas in bathrooms was withdrawn without replacement in 2007, because it inadequately considered the requirements of disabled people. The dimensions given here should therefore be considered as absolute minimums.

The movement areas in bathrooms should generally be based on the 'Accessible building' standard → 11 → p. 21 ff.

The basic bathroom categories are: (guest) **WCs** with WC and washbasin → 3 – 4, **shower rooms** with shower and basin → 5 – 6, **bathrooms** with bath, washbasin and WC → 7 – 8, **full bathrooms** with bath, shower, washbasin and WC → 9 – 11.

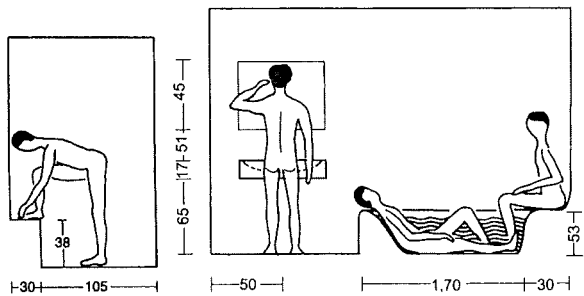
Because of the high humidity and resulting **condensation**, the surfaces must be **easy to clean**. Wall and ceiling plaster should be able to absorb and release enough moisture. Floor coverings should be sufficiently **slip-resistant**. If there is no laundry room, the bathroom must be designed with space and connections for a **washing machine**, washer/dryer and laundry basket.

One **earthed socket** is to be provided (next to the mirror). In addition, the following should be included in the design of bathrooms and WCs: cupboards for towels and cleaning materials, lockable medicine cabinet, towel rail (perhaps with additional heating), hand grips above the bath.

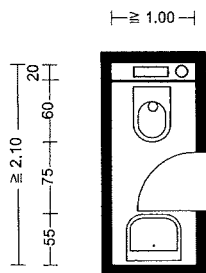


1 Space requirements in bathroom (guideline values).

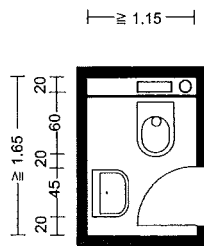
Room between bath and wall



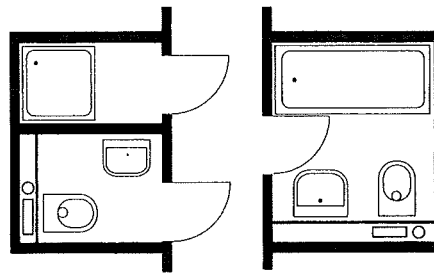
2 In the shower At the washbasin Bathing and sitting



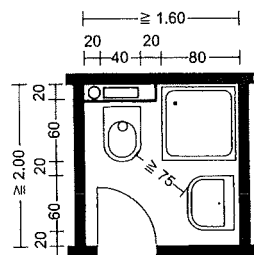
3 WC with washbasin



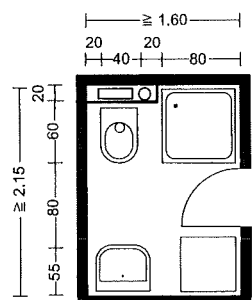
4 WC with handbasin



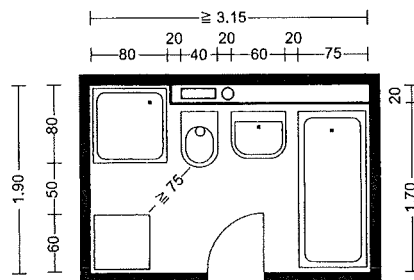
9 Functional split of the bathroom into separate rooms



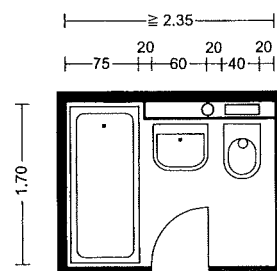
5 Space required for shower



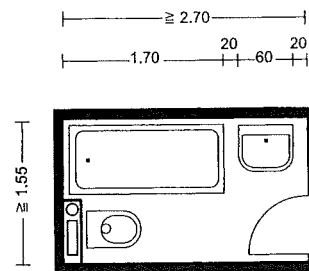
6 Shower room with washing machine



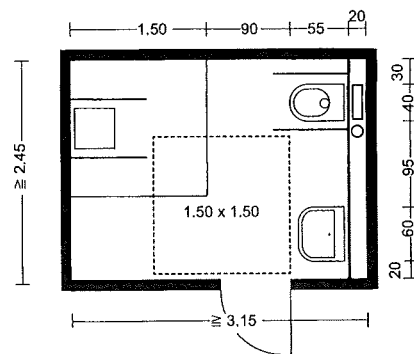
10 Full bathroom with space for washing machine



7 Space required for bathtub



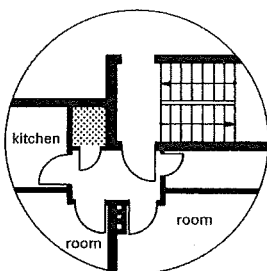
8 Full bath



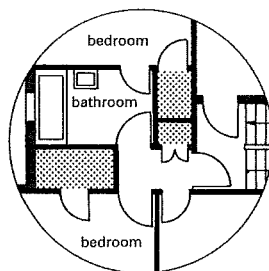
11 Accessible bathroom with showering space

ROOMS

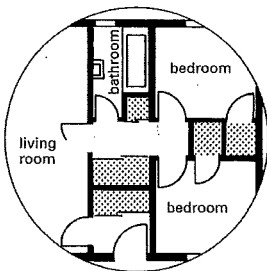
Subsidiary Rooms



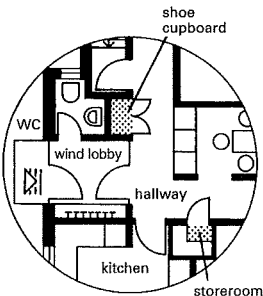
1 Storeroom on internal corridor



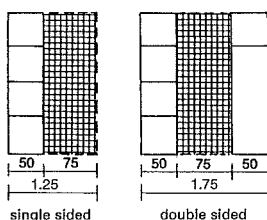
2 Storage spaces in the corridor and bedrooms



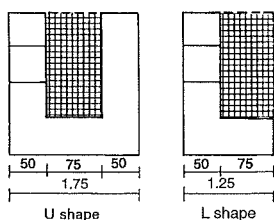
3 Storage and cupboard spaces



4 Storeroom and shoe cupboard in the entrance area



5 Larders → 6 - 13



Storerooms

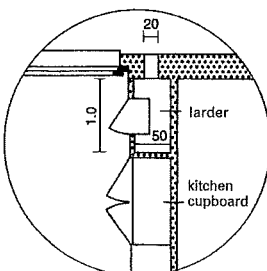
Storerooms are used for keeping and storing cleaning equipment, tools, cleaning agents, shopping baskets, and bulky items like bags, suitcases, washing baskets and stepladders. Sufficiently large storerooms, particularly in flats, make a considerable contribution to comfort. **The building regulations require that every flat or house be provided with a sufficiently large storeroom.**

In addition to cellar and attic areas in a property, storage space should therefore be provided within a flat of $\geq 1 \text{ m}^2$ with a clear width of 75 cm. In larger flats, 2% of the floor area should be provided as storage space (split into many small areas is also acceptable). It is practical to locate a part of this storage area near the kitchen.

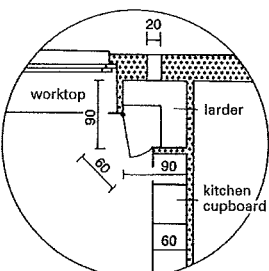
Storage rooms can be in the form of niches (for built-in cupboards) or box rooms → 1 - 4. Doors to storerooms should open outward for reasons of space. The light inside the room should be operated by a contact switch by the door. Good ventilation should be provided.

Larder, pantry

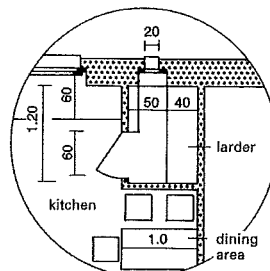
When designing a flat or house, a larder (or pantry) should be installed in addition to the general provision of storage space, despite the additional space required, with shelves to the ceiling. This is for the storage of supplies of food and drink, as well as fresh foodstuffs which keep relatively well; space can thus be saved space in the refrigerator. Basic layouts of larders → 5. It is most practical when the larder is next to the kitchen. It should be cool, ventilated and protected from direct sunlight → 6 - 13. If required, a socket for a freezer should be provided, and possibly also a wine cooler.



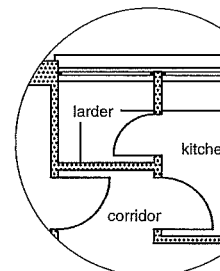
6 Larder next to cupboard



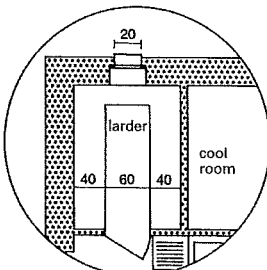
7 Corner larder



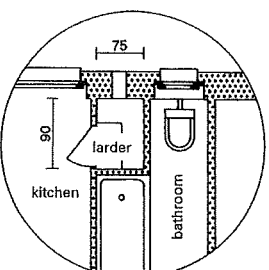
10 Larder next to eating area



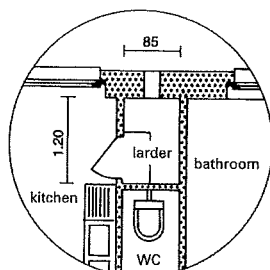
11 Larder with high-level window



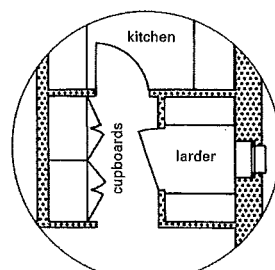
8 Spacious larder



9 Larder using space next to bath

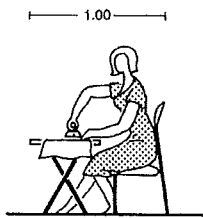


12 As before, next to WC

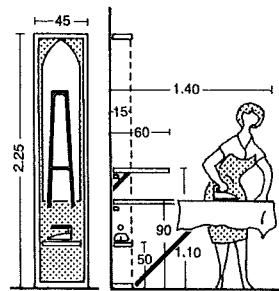


13 Larder in lobby to kitchen

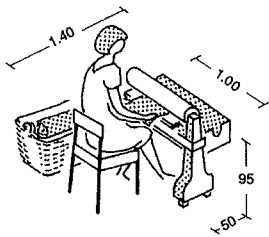
Subsidiary Rooms



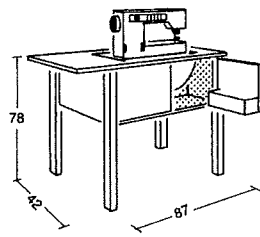
1 Space required for ironing while seated



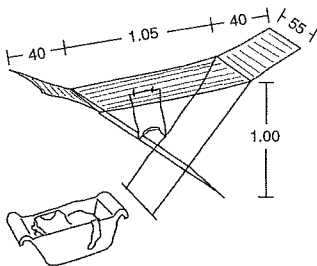
2 Built-in cupboard for ironing board



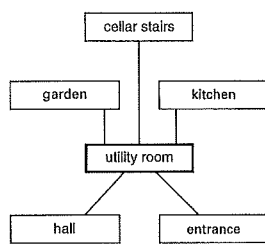
3 Ironing machine



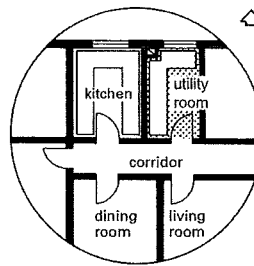
4 Sewing machine



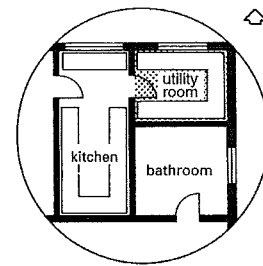
5 Space required for clothes horse



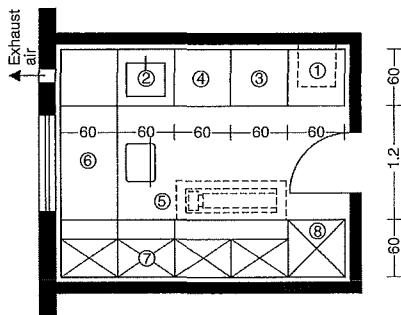
6 Scheme of relationships of rooms to the laundry/utility room



10 Next to the kitchen, accessible from the corridor

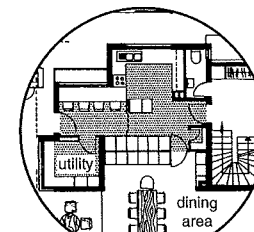


11 Accessible from the kitchen

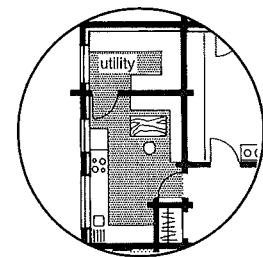


7 U-shaped laundry/utility room

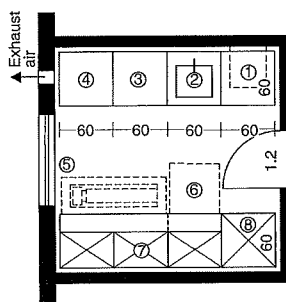
- ① Dirty washing (chute)
- ② Washbasin
- ③ Washing machine
- ④ Washer/dryer
- ⑤ Ironing machine
- ⑥ Work top
- ⑦ Wall cupboard
- ⑧ Tall cupboard



12 Kitchen-eating area-laundry/utility room



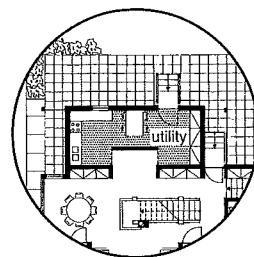
13 Next to eating area



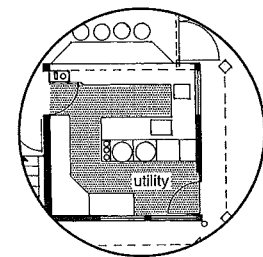
8 Two-lane laundry/utility room

Equipment and appliances	Width (cm)	Better
automatic washing machine and washer/dryer above each other	60	60
washbasin with water heater	60	60
laundry basket	50	60
washing worktop	60	120
ironing machine	approx. 100	100
cupboard space for minor equipment	50	60
total	approx. 380	460

9 Equipment and space required



14 Kitchen—eating area—laundry/utility room



15 One-room kitchen and laundry/
utility room

Laundry/utility rooms

Laundry/utility rooms are used to carry out domestic work like washing and drying clothes, ironing and sewing. They can also be storage rooms for small items of equipment, detergents, cleaning agents and polishes, buckets and vacuum cleaners, tools and ladders. The provision of a laundry/utility room is particularly useful in flats, despite the additional space required.

These rooms are best placed to the northeast, next to or easily accessible from the kitchen → **4 – 10**. In this way, tasks can be combined and carried out by one person. In detached houses, direct access should be provided to the garden (for drying laundry).

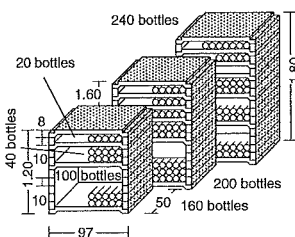
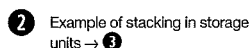
In the design of utility rooms, a comfortable and healthy arrangement of appliances is important: An ironing board used in the standing position requires a different height to one that is used seated → **① – ③**. A fully adjustable ironing board is ideal. A worktop of 1.20 m width should be provided to deal with the washing. Good uniform lighting is required in the working area of the laundry/utility room (average light intensity ≈ 350 lx).

Residential buildings

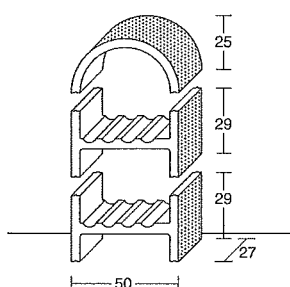
ROOMS

Access
Kitchens
Living areas
Bathrooms
**Subsidiary
rooms**
Garages

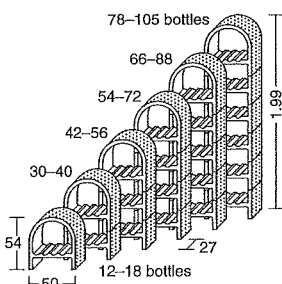
Subsidiary Rooms



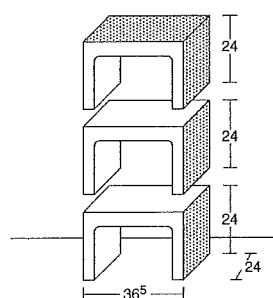
3 Wine rack/breeze block



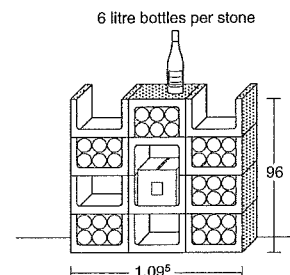
4 Wine rack of quarried natural stone



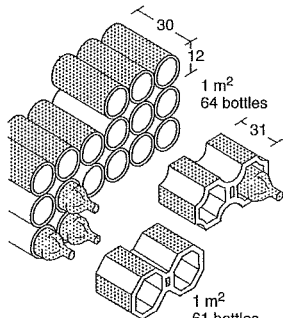
5 Rack heights → **4**



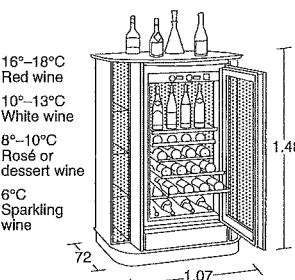
6 Sand-lime rack blocks



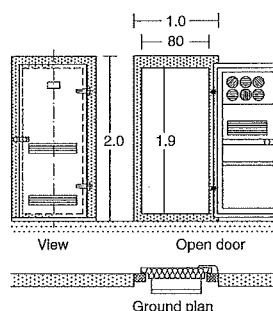
7 Inspection rack → 6



8 Clay tubes and ornamental blocks



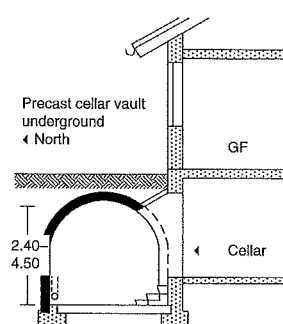
9 Air-conditioned cupboard for wine



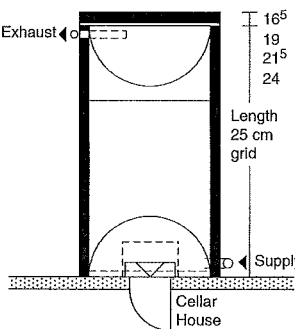
10 Air-conditioned door for wine

Temperature (°C)	Wine Type
18	Room temperature; Best red wines, particularly Burgundy
16	Red Burgundy; Chianti, Zinfandel, Côtes du Rhône, Ordoinaires
14	White Burgundy, Port, Madeira
12	Cellar temperature, Sherry; Lighter red wines e.g. Beaujolais
10	
8	Dry white wines, Champagne; Rosé, dessert wines, Lambrusco
6	Fridge temperature; Sweet white wines, Sparkling wines general
4	Sparkling wines general
2	
0	

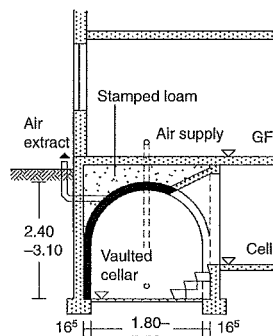
11 Storage temperatures for wines



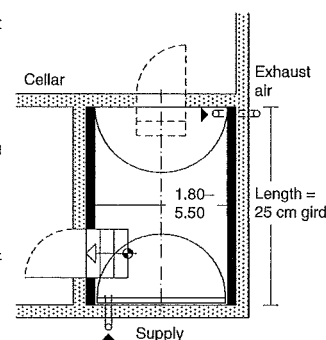
12 Vaulted cellar



13 Plan \rightarrow **12**



14 Installed in a cellar



15 Plan → **14**

Wine cellars should if possible be below ground on all sides. The location should be next to the house; the north side is recommended. Ideal conditions are 70% humidity, 10–12°C. Wines age quicker with every degree above 12°C. (Temperatures of 1–10°C do not damage wine.) Such requirements can be met through the use of air conditioning, or an air-conditioned cupboard or door → ⑩. When air conditioning is used, the ceiling and walls should be insulated. A sealed door (2.01 × 0.63 m) of coated and insulated steel plate should be installed. A porous, breathing floor, like sand or unglazed bricks, and brick walls provide natural humidity.

Lighting in a wine cellar should be as low as possible and only switched on when required. Storage shelves should be of porous, breathing materials, e.g. breeze block, quarried natural stone, sand-lime blocks or Hydroton expanded clay elements. This regulates the humidity and stabilises the temperature. A natural microclimate is created in the room → **2 – 7**.

On account of the temperature graduation, sparkling wines should be stored near the floor, white wines in the middle and red wines as high as possible → 9 + 11.

ROOMS

Subsidiary Rooms

Residential buildings

ROOMS

Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages

MBO

see also:
Storerooms
p. 162

Communal storerooms

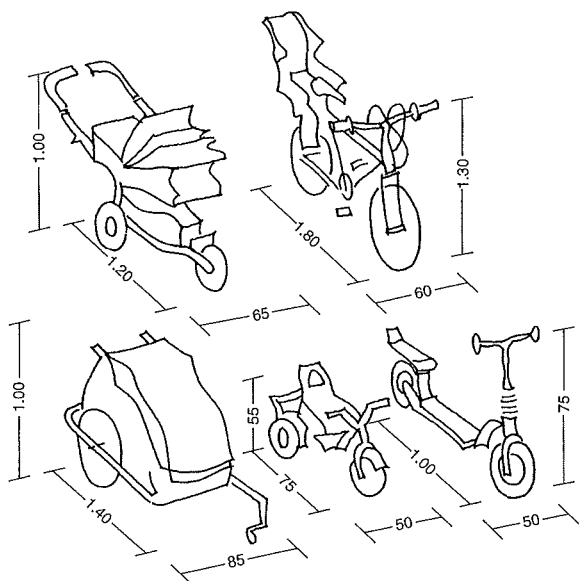
In addition to the storerooms or storage spaces in each flat, for residential buildings in building classes 3–5, the building regulations require an easily accessible (communal) storeroom for prams, pushchairs and bicycles. Corresponding areas should also be provided in other residential buildings and detached houses.

For the design of these rooms, it can be assumed that at least one vehicle per occupant (including children) has to be accommodated. In addition to bicycles, prams and pushchairs, it is also necessary to consider mopeds, tricycles, trailers etc. → ①.

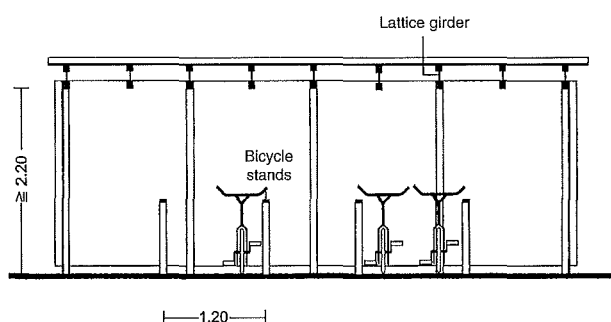
The rooms should if possible be located at street level, be lockable and equipped with hooks and bicycle stands to secure the stored vehicles. They can be laid out as storerooms inside the building (with access to the entrance) or as separate bicycle sheds → ② – ③. A sufficient number of additional bicycle stands should be provided in the open air, particularly if the storeroom has been situated in the cellar.

Cellar

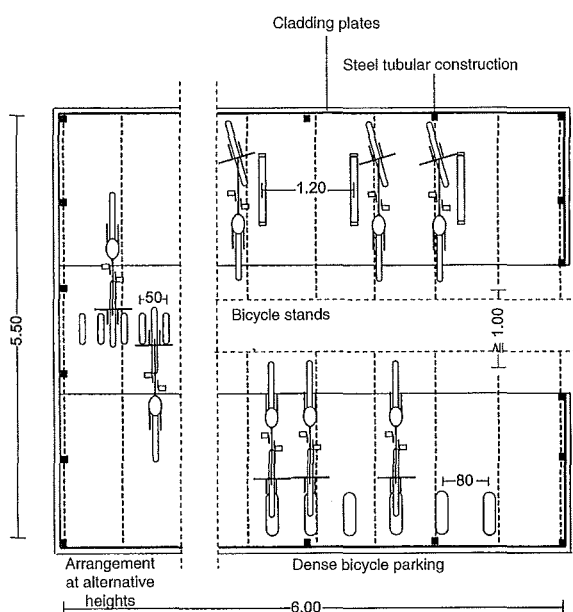
The storage space provided for each flat normally consists of a storeroom inside the flat → p. 162, and an additional space outside the flat. This is normally provided as a cellar compartment → ④ – ⑤, but can also be provided inexpensively as a parking shed in the grounds. Cellar storerooms should be dry and well ventilated. Natural lighting is to be recommended. Appropriate detailing of the window opening can optimise the light entering → ④.



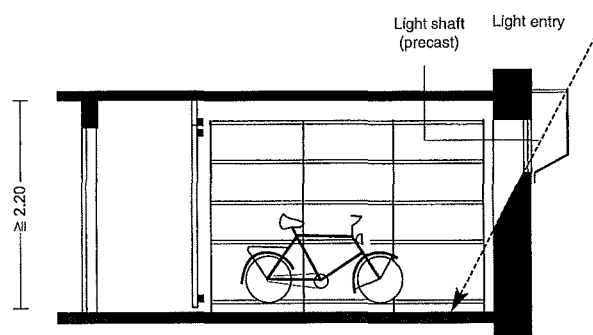
① Space required for bicycles, prams, pushchairs, bicycle trailers, tricycles, mopeds etc.



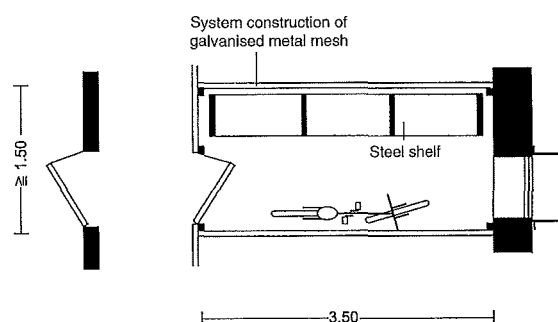
② Section → ③



③ Bicycle/pram room for about 20 vehicles (example)



④ Section → ⑤



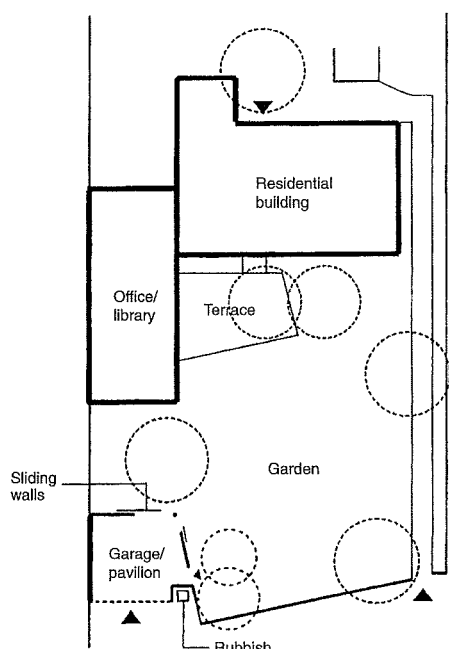
⑤ Cellar compartment in a residential building (example)

ROOMS

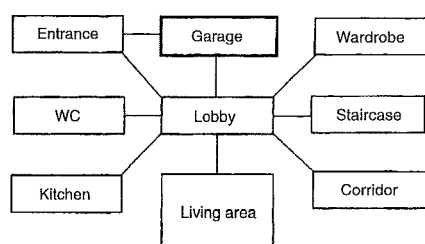
Garages and Carports

Residential buildings

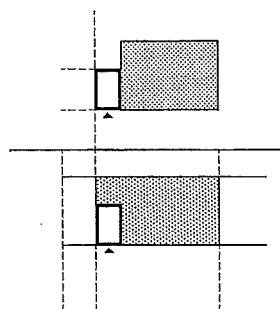
ROOMS
Access
Kitchens
Living areas
Bathrooms
Subsidiary rooms
Garages



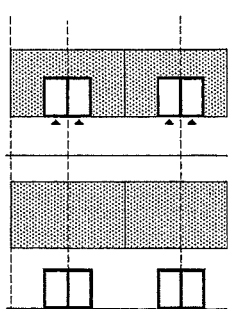
1 House with double garage at the front (can also be used as a garden pavilion)
Arch.: Studio Paretala



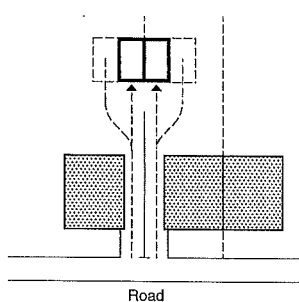
2 Relationship between the garage and other areas of the house



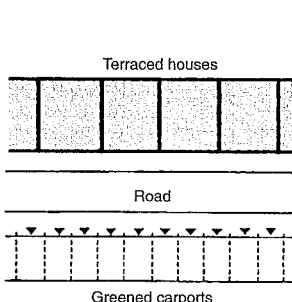
3 Garage next to or in a detached house



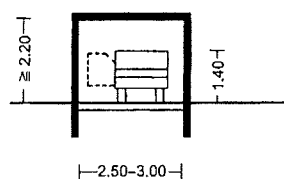
4 Garages next to or in terraced houses



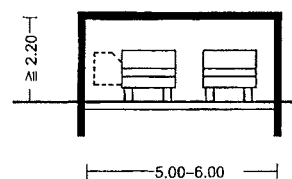
5 Garage at the back of the plot



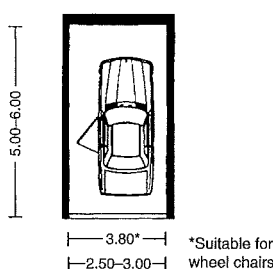
6 Communal parking spaces



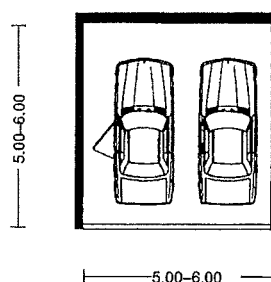
7 Section → 9



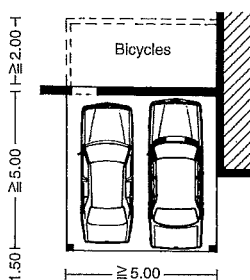
8 Section → 10



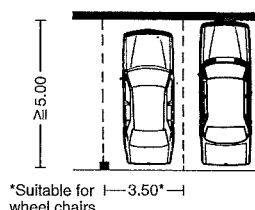
9 Single garage



10 Double garage



11 Carport for two cars and possibly bicycles



12 Carport as communal parking place

According to the building regulations, the necessary parking spaces must be provided **in the grounds** of the residential building itself or in other suitable grounds at a reasonable distance where it is legal to park. The parking spaces are often provided as **single** or **double garages** or **car parks**, free-standing or attached to the building.

Space requirement → 7 - 12. A reduction in the parking area is possible for private houses. The tendency of modern cars to get larger (including in height) should be taken into account.

In addition to garages, roofed-over parking places (**carports**) represent a cheaper, more beneficial in terms of building physics (no condensation in cold cars in the winter!) and space-saving possibility for protecting cars adequately from the weather (a close wall on the weather side is a good idea). A combination with enclosed storerooms (for bicycles etc.) is to be recommended → 11. Carports are particularly suitable for communal parking places → 12.

Examples of the layout and design of parking places for cars in connection with residential buildings → 3 - 7.