

# Basic types

From a building technology point of view, standard multi-storey housing in the period 1850–2000 can be roughly divided into five basic types, excluding the many experimental designs of the 1950s.

Most of these basic types share the same floor plan: the starting point is a staircase/ staircases and kitchens facing each other, and to each side a varying number of rooms, all as a rule with access from a hallway/corridor. The first two types have access to two wooden staircases from each apartment, the last three have access to a single concrete stairway only.

Each of the first four types has storey partitions which, in principle, span from one exterior wall to the other and are supported on a longitudinal internal wall (main partition). The specified time period refers to the benchmark building legislation, i.e. Copenhagen's, and in the case of the first two types, the dividing line outside of Copenhagen (and Frederiksberg) will be less exact, depending on the existing local building legislation.

## **Type 1**

The first type is a direct continuation of the building type that had been evolving in densely populated towns since the 1700s.

It is a building with brick-built (i.e. solid masonry) exterior walls. The interior walls on normal floors are predominantly of brick-lined timber and of masonry on the bottom floor (basement). Some interior walls on normal floors may be constructed as double board partitions.

The storey partitions are made from timber joists and the stairs are of wood. The roof is covered with tile, slate or metal supported on a wooden frame.

Foundations are constructed of brickwork – possibly using natural stone as determined by local conditions.

This type is virtually unchallenged in the period up to the 1890s.

## **Type 2**

The second type also has solid brick-built exterior walls, but differs from the first in having main partitions and walls enclosing stairs constructed of solid brickwork: this became a legal requirement in Copenhagen in 1889 and was then extended to other large towns. The remaining interior walls are predominantly double board partitions.

The storey partitions are a joist framework, with wooden beams sometimes replaced by iron beams, where required for structural reasons – e.g. for supporting bays – or (exceptionally) with cast concrete for the purposes of watertightness (below the bathroom). Iron joists proper in the form of kappedæk are often used as protection against moisture or fire – e.g. over basements.

Stairs are made of wood.

The roof structure and covering are the same as in type 1.

Foundations – and possibly the basement walls as well – are of concrete cast on site. This type is the most common up until the start of the 1930s, and from around 1920 has bathrooms in the larger apartments.

### **Type 3**

The third type, like the previous ones, has solid brick-built exterior walls. The windows are often larger than before, and as a new feature are also placed at and around corners; the exterior walls therefore include a large proportion of iron structures.

Bays are a common occurrence. There are also balconies, as a condition for the use of a single staircase.

As before, interior walls are constructed of brickwork or as double board partitions or are made of cement-based sheet material around the (now commonplace) bathroom. Storey partitions are joist frameworks with a (large) number of iron beams, necessitated partly by the bay and balcony structures and partly by the bathrooms.

The single staircase is constructed of prefabricated steps and landings of situ-cast concrete.

Roof coverings now include those made of felt and cement-based boards, usually in connection with low-pitched roofs, though are still mounted on a wooden structure. Foundations and basement walls (and possibly internal basement walls) are of situ-cast concrete.

Type 3 is widely used during the 1930s. It is gradually replaced by type 4 below (partly because of wartime material shortages of iron) and finally ceases to be used in slightly higher buildings after a legal requirement in 1950 relating to the construction of fire-proof floors at the roof space.

### **Type 4**

The fourth type is broadly similar to the third, though with the important difference that the storey partitions are made of concrete – either as reinforced concrete slabs cast on site or as hollow block floors available in a multitude of variations.

The single concrete staircase of prefabricated steps and landings begins to appear at the end of the 1940s, but its use is conditional upon the availability of a crane.

The roof covering and construction are the same as in type 3.

The foundations and basement walls are also as in type 3.

This type started to gain momentum during the 1930s and became the norm in the 1950s, except where buildings were of an experimental nature.

### **Type 5**

Of the many varieties of building constructed of prefabricated elements, type 5 proved to be the preferred option.

The building's interior (shell) is constructed entirely of factory-made concrete elements. Floors and staircases are supported by interior transverse walls, which, together with a

smaller number of the longitudinal ones, also add stability. The remaining interior walls are room-high slabs of lightweight concrete and/or wooden skeletons finished with a plasterboard cladding.

Longitudinal exterior walls are neither load-bearing nor stabilising and in most cases are of a lightweight construction. Transverse exterior (gable) walls are stabilising and either erected as a sandwich structure or as the corresponding interior walls and thereafter clad externally.

The roof covering consisting of several layers of felt (built up) enables flat – almost horizontal – roof surfaces, constructed either from thermal insulation material or as a light timber structure directly onto the roof floor. Such roof structures became widely used. Otherwise, it was still the raised but low-pitched roof covered with cement-based roofing sheets or felt on a timber foundation that was used. Grooved tiles of concrete or brick still occur, but usually in connection with higher slopes.

### **3D models**

The five basic types are shown as generic line drawings in the Gallery below. They are also available, with expanded details, as interactive 3D models at [danskebygningsmodeller.dk](http://danskebygningsmodeller.dk).