The disadvantages of container-based production and/or operating facilities are well known to those who have already lived or worked in a container: even given the good insulation, air-conditioning and heating that is nowadays possible, containers cannot be compared with the sense of space of a permanent building. Prolonged occupation for an entire working day and over several weeks and months reduces the motivation of the workers employed therein. However, such container solutions also have technical disadvantages, especially as regards their connectivity to permanently installed infrastructure. Ultimately, they are always a provisional solution.

There is no difference if a modular laboratory is constructed using a multiplicity of standardized containers, as shown in DE 10361621 A1 or in WO 2011/075625 A1 or in DE 102006001977 B3.

An improvement in the quality of accommodation in a container-based operating facility of modular construction can be achieved by inserting container-based functional units into a static building. This concept is described in DD 87156 A1, relating to telecommunications, and in EP 0572814 B1 for plants in the chemical and pharmaceutical industry. However, the modularity taught in said documents is limited, and therefore the flexibility with which the developed site can be used and the speed of conversion required to use the building for a different purpose is limited.

~~In light of the above prior art, it is the underlying object~~ Embodiments of the invention ~~to~~ specify a method for using an industrial site in which the available area of the site is used in a particularly effective way by virtue of the fact that conversion times and costs are reduced and a greater freedom of choice as regards the subsequent use of existing buildings is achieved.

~~These objects are achieved by a method having the features of claim 1.~~

~~Consequently, the invention relates to~~ According to a first aspect of the present invention, there is provided a method for using an industrial site, comprising the following steps:

a) Erecting a permanent building on the site, wherein the building has a multiplicity of bays for receiving interchangeable functional units, a building shell to protect the functional units received from the effects of weather, technical building equipment and an infrastructure grid for energy and/or materials and/or data;

b) Providing a multiplicity of pallets, which are neutral as regards the use thereof, are standardized as regards the dimensions thereof and are designed to be received by the bays of the building;

c) Equipping pallets with production and/or operating devices at one or more locations remote from the site to give a first generation of functional units for a specific purpose;

d) Transportation of the functional units to the site;

e) Installation of the first generation of functional units in the building by inserting the functional units in the bays;

f) Connecting the functional units to at least some of the infrastructure grid;

g) Using the first generation of functional units within the building in accordance with the purpose of the respective functional unit;

h) Equipping pallets with production and/or operating devices at one or more locations remote from the site to give a second generation of functional units for a specific purpose, which differ at least partially from the functional units of the first generation as regards the respective purpose thereof;

i) Replacing the first generation of functional units with the second generation of functional units;

j) Using the second generation of functional units within the building in accordance with the purpose of the respective functional unit.

It is a basic concept of the present method to subdivide the individual functions of a fully equipped building integrated into the infrastructure of an industrial site as regards the duration of use of the technical devices and, with a decreasing time in use, to provide increasing modularization of these functions. The permanent functions of the fully equipped building are accordingly permanently installed, while the devices which are subject to use for a shorter time on the basis of their purpose are embodied in a correspondingly modular and interchangeable manner.

More specifically, this means that the building shell of the building is erected in an unchangeable and permanent manner on the industrial site. The building is connected to the surrounding infrastructure, by means of which the building is supplied with energy and/or materials and/or data, in an equally permanent and fixed manner. The production and/or operating devices for a specific purpose which are essential for the specific use of the building are combined into mobile functional units independently thereof. The functional units are intended to be inserted into the bays of the building and to be connected to at least some of the infrastructure grid of the building.

According to embodiments of the invention, each functional unit is, in turn, subdivided into a pallet, which is essentially neutral as regards the use thereof, and into production and/or operating devices, with which the pallets are equipped and which define the purpose of the functional units. This creates the advantage that the pallets can be equipped with the production and/or operating devices at a remote location - i.e. off the site to be used - e.g. in a workshop. The functional units assembled in this way outside the building can then be transported to the site and inserted there into the building. Setup times within the building are thereby considerably reduced. Equipment mounting outside the building also makes it possible to use low-priced areas.

Another advantage of the pallet system is that the pallets can be used for several generations if the service life of the operating and/or production devices mounted on the pallet is exceeded. The pallets can also be stored for later use.

The system according to embodiments of the invention and the method carried out by means of the system thus have significantly higher flexibility than was previously known in the prior art and therefore offers better utilization of the resources used, namely materials, time and space.

Moreover, the output of the technical equipment of the building is more effectively scalable by virtue of its modular construction, thereby avoiding over- and underdimensioning of the plants. Ultimately, the effect is that unnecessary energy consumption is avoided.

In ~~a preferred development~~ an embodiment of the method according to the invention, at least some of the functional units of the first generation are transported, after each replacement, to a second building remote from the site, and are inserted and used in said building. The underlying concept behind this ~~development~~ embodiment is that the system is used not just at one location but also across locations. Thus, it is conceivable for a pilot-plant unit used in a building on a first integrated site to be removed from there at the end of the project phase and used again in a second building at a location B for the same or a different purpose.

If a replaced functional unit cannot be reused, it is recommended that the operating and/or production devices which define its function be removed from the pallet, leaving a pallet which is neutral as regards the function thereof, which can be reequipped or stored for subsequent use. According to embodiments of the invention, this reequipment of the pallets can take place at one or more locations remote from the site to be used, ensuring that these setup times are not included in the conversion times. Moreover, reequipment or storage can take place at low-cost locations. The reusability of a pallet which has already been used also contributes to the sustainability of the system according to embodiments of the invention.

In ~~a very particularly preferred development~~an embodiment of the invention, the operating and/or production devices which are inserted into the building as functional units can be subdivided into two functional groups. The first functional group comprises chemical, biological, physical or nutritional production plants, laboratory or pilot plants or offices. In contrast, the devices of the second functional group comprise technical building equipment, heating systems, air-conditioning systems, fire extinguishing systems, storage rooms, compressed air supply systems, water supply systems, power supply systems, sewage systems, systems for providing starting materials, systems for providing process energy, such as especially heat or cold, exhaust treatment systems, such as especially thermal afterburners, activated carbon adsorption or exhaust gas scrubbing, sanitary systems or staff rooms.

The first functional group comprises those operating and/or production devices which are designed very specifically for the respective use of the functional unit and which, accordingly, have a very short service life. The devices in the second functional group, in contrast, are general purpose devices and, accordingly, can remain in the building for several generations of use. Thus, for example, a heating system will always be required when personnel are in the building for a relatively long time. A functional unit carrying the heating system can therefore be installed as part of the initial equipment of the building and can remain therein for as long as there are laboratory facilities and offices in the building, for example. A compressed air supply system, on the other hand, is only required while there is a pilot plant in the building. If the pilot plant is removed at some stage, the compressed air supply system can also be removed and used again at some other location. Instead of the compressed air supply system, this bay of the building can now be occupied by a staff room, for instance if the pilot plant has been replaced by an office and the increased number of workers in the building requires the setting up of a staff room.

~~A preferred development~~An embodiment of the invention therefore envisages that, in situations in which functional units of both functional groups have been installed in the building, at least some of the functional units of the second functional group remain in the building when functional units of the first generation are replaced.

The high degree of modularity of the present concept, in which even the technical building equipment is embodied in interchangeable functional units, shows its flexibility particularly when production and/or laboratory facilities are replaced by offices or vice versa. This aspect has not previously been taken into account in the reusage concepts for modular production plants previously described in the prior art.

~~The invention also relates to~~According to a second aspect of the present invention, there is provided a system for using industrial sites

- having at least one permanent building, which has a multiplicity of bays for receiving interchangeable functional units, a building shell to protect the functional units received from the effects of weather, technical building equipment and an infrastructure grid for energy and/or materials and/or data;

- and having a multiplicity of functional units, wherein each functional unit comprises a pallet, which is essentially neutral as regards the use thereof and is equipped with production and/or operating devices in order to define the purpose of the functional unit.

In this case, the building can be embodied in a manner known per se to accommodate functional units. Suitable designs of building are known from DE 3036468 A1 and DE 202011108631 U1, for example.

~~A preferred development~~An embodiment of the invention envisages that the bays of the building and the pallets of the functional unit are designed so as to correspond to one another in such a way that they form a standardized interface within the system. The standardized interface signifies first of all that fundamentally any pallet with any functional unit can be inserted into any bay. This increases flexibility.
The interface is preferably formed by a linear guide assigned to the bay and by a carriage arranged on the pallet, which can be inserted into the linear guide. This makes it possible to insert the functional unit with the carriage into the linear guide of the bay and thus to push the functional unit into the building. The carriage does not

have to receive sliding guidance in the linear guide: it is also conceivable to provide the carriage with rollers.

In a particularly preferred embodiment of the system, the pallets and/or the functional units constructed thereon are dimensioned in such a way that they correspond to a standardized container format such as that for sea containers according to ISO 668. This makes it possible to transport the functional units using existing transportation logistics between the plots or buildings to be used. The side walls and the roof of the container are not required while in use since the functional unit is, of course, protected by the building shell from the effects of weather. It is therefore conceivable to fasten the walls and the roof on the functional unit only for transportation and to remove them again during installation in the building.

The system according to embodiments of the invention preferably comprises a plurality of buildings which are provided with corresponding standardized bays for receiving the functional units. This makes it possible to use the same functional unit initially at one location and then in the second building at a different location.

In ~~a very particularly preferred embodiment~~ an embodiment of the invention, at least one building of the system is subdivided into at least three sections, namely a first section, which comprises a multiplicity of bays for functional units, a second section, which likewise comprises bays for receiving functional units, wherein the number of bays in the second section corresponds to the number of bays in the first section, and a third section without bays, wherein the third section is situated between the first and second sections and wherein in each case one bay in the first section is assigned to one bay in the second section, and the respectively assigned bays in the first and second sections are arranged in alignment with one another on each side of the third section. This building concept allows particularly short paths between the two mutually assigned functional units.

In such a building concept, the bays should each be individually accessible from the outside for the insertion of functional units, and the third section should comprise a floor region, from which all the bays can be accessed from the inside. A building

configured in this way has particularly advantageous usage of space and allows short paths between the inserted functional units.

~~A preferred development~~ An embodiment of the invention envisages that there is a path which extends along the linear guide of the bay and from which an installed functional unit can be accessed from the side without barriers. This improves access to the individual functional units. It is namely advantageous that the functional unit extends in the direction of the linear guide, for which reason access to the functional unit from the side is more agreeable than access by the end, e.g. through the loading aperture of a container. As already mentioned, the walls and the roof of the functional unit can be removed in the installed state, further improving access to the production and/or operating devices arranged on the pallet.

According to a third aspect of the present invention, ~~The invention also relates to~~ there is provided the use of the system according to the second aspect of the invention to carry out the method according to the ~~invention~~ first aspect of the invention, such that a system is used in which the building contains three sections in the manner described, and that functional units of the first functional group are installed in the first section of the building, and functional units of the second functional group are installed in the second section of the building, wherein at least some of the technical building equipment is embodied as functional units of the second functional group and said units remain in the building when functional units of the first functional group are replaced.

~~This preferred embodiment~~ Embodiments of the invention ~~is~~ are based on the concept of arranging primarily those functional units of the second functional group which are used for a longer time in the second section of the building and, in this case, accommodating particularly the technical building equipment here. On the other hand, those functional units in the first group which have to be exchanged frequently are accommodated in the first section of the building. Consequently, rapid exchange between the generations takes place in the first section, while the functional units used over the longer term