

# VST PERMANENT FORMWORK SYSTEM – A PASSIVE HOUSE SUITABLE COMPONENT

The term *Passive House* („Passivhaus“ in German) refers to the rigorous, voluntary, Passiv House standard for energy efficiency in buildings. It results in ultra-low energy buildings that require little energy for space heating or cooling. The standard is not only confined to residential properties; several office buildings, schools, kindergartens and a supermarkets have also been constructed to the standard.

The Passive House standard for central Europe demands that the building fulfills the following requirements:

- The building must not use more than 15 kWh/m<sup>2</sup> per year in heating and cooling energy
- With the building de-pressurized to 50 Pa (N/m<sup>2</sup>) below atmospheric pressure by a blower door, the building must not leak more air than 0.6 times the house volume per hour ( $n_{50} \leq 0.6$  / hour).

A „VST Passive House“ database was developed for the VST permanent formwork system. This database contains different information with designed, tested and certified construction details to achieve the Passive House standard. By using the sustainable VST permanent formwork system a substantial part of CO<sub>2</sub> reduction will be achieved.

The VST permanent formwork system is a component suitable for Passive House - certified by phi - Passivhaus Institut Dr. Wolfgang Feist (Darmstadt, Germany).



„What matters is a fundamental transformation of civil engineering and not a rationalization of past working methods.“

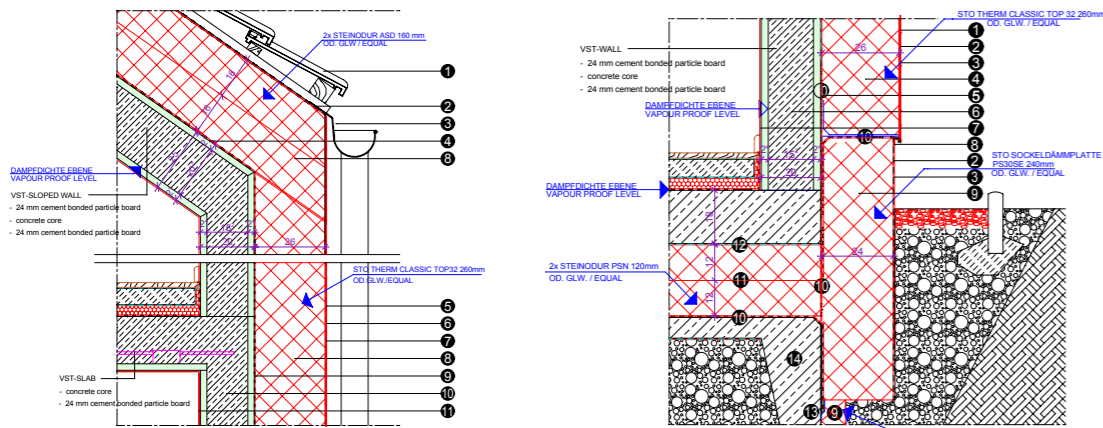
Ludwig Miës van der Rohe, »Industrielles Bauen«, 1924

Our innovative composite formwork system allows industrialization and high flexibility. At the same time it meets all ecological and economical requirements.

## VST PERMANENT FORMWORK SYSTEM

The VST group is a European company - its origin is Austria. Being innovative in terms of development of formwork elements, the VST Group covers all fields of project management and acts as building contractor. The result is like a tailor made suit for the client in an unbelievably good quality and with an amazing speed. Today's construction demands will be met easily.

The basic methods of erecting a raw superstructure are very traditional - since generations. The VST Group has identified these limits and exceeds the solutions on hand successfully with its self-developed VST permanent formwork system.



- design
  - structural analysis
  - building physics
  - project management
  - construction service
  - permanent formwork system
  - passive house
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## GENERAL INFORMATION CONCERNING THE VST-SYSTEM

The patented VST-System is a permanent formwork system. The shaping formwork is made of cement bonded particle boards (cbpb) with a thickness of 24mm. In the production plant the materials are fitted together in an industrial way.

### The following elements can be provided:

**Walls** (vertical or pitched), **Slabs** (horizontal or pitched), **columns, beams, stairs** and **special construction elements** (e.g. shear heads, window boards – to place windows into the area of thermal insulation, etc.).

**Reinforcement** will be placed in factory (except slabs and reinforcement for continuity).

The wall- and slab elements present the composite shell, which will be assembled accurately on construction site. The definitive stability will be reached after casting with flowing concrete or self compacting concrete (scc).

The result is a solid structure construction without any joints.

For shaping the elements and for retaining the concrete pressure, special patented mechanical steel joints are screwed from the inside. The room sided surface is plain and ready for painting (based upon VST group guidelines)

With the VST-System a special construction method was developed, which assures

- an unusually short construction period
- favourable total costs
- an agreeable climate inside the rooms
- a consistent high quality

All components fulfil all quality-, safety- and security requirements and are fully approved (CE, ETA, **BBA**). The sustainable VST system is flood-proof.

## ADVANTAGES COMPARED TO CONVENTIONAL CONSTRUCTION METHODS

The VST-System is an offsite construction method based upon the principle of permanent formwork. A large part of the activities on site will be moved to the production plant, where all processes are independent of weather conditions.

The works on site are confined only to assembling and concreting. So ~55% of the wage costs are independent of weather conditions, journeys home, overnight stays and of course bigger risks for accidents at work.

The advantages of modern, industrial manufacturing in a plant are on the one hand a higher efficiency of one working hour (due to an optimised sequence of operations) and on the other hand a plant utilisation up to a three shift operation.

The VST-System provides uncommonly short construction times. The efficient and simple assembling of the elements, the non-need of handling and

striking of the formwork on site and of the plasterwork with the needed following drying time and the elimination of work for installation service shafts, chases and openings allows construction times up to 50% less than with conventional construction methods.

The VST-System method reduces the building site equipment and overhead costs. Lighter cranes are required and for casting fluid concrete or scc will be used.

This leads for site installation to lower space requirements, less energy consumption, less waste and to a reduction of winter precautions.

Certainly, these are also advantages at site in cramped plots and urban-planning context. Also the cleaning of the construction site can be widely avoided by using the sustainable VST-System.



### VST-System combines the advantages of the reinforced concrete method

- acceptance of compressive and tension forces
- high resistance against static and dynamic loading (earthquakes, etc.)
- excellent sound insulation and airtight construction
- very good heat insulation behaviour with the advantages of timber construction
- agreeable climate in the rooms caused by a high humidity exchange and a nearly consistent surface temperature of the cbpb.

