Ground sill construction

Casing for a door or a window, which may or may not be provided with a moveable part, in which the casing comprises a ground sill, which is made of polyolefin. The ground sill has a molecular weight of between 150,000 and 4,000,000, preferably $0.5 \times 10^6$. The material of the casing is a polyethene and is formed from the group LDPE, LLDPE, HMWPE and UHMWPE.
The invention relates to a casing for a door or a window, which may or may not be provided with a moveable part, such as a door leaf or a sliding door. In particular the invention relates to such casings which are situated at or below ground surface.

Such casings are known in many designs. In a known embodiment the posts and both sills are made of wood. Such casings are usually prefabricated in a joinery’s works and are set as a unity in the construction at the building site, the ground sill attached to the concrete floor parts.

In another known embodiment casings of wood are used but then provided with a ground sill of nature stone or so-called artificial stone, such as for instance Holonite (registered trademark). Nature stone is durable but has the drawback of being difficult to work and expensive. Artificial stone is a reasonable substitute for nature stone, but is also difficult to work so that it has to be brought in the exact shape beforehand. Because of the moulding process the bottom side has a slightly broader width than the upper side -suited to the post cross-section-, as a result of which placing this ground sill can be problematic. Furthermore both kinds of "stone" have in common that the sill made from them may from a cold bridge. Moreover, special provisions have to be made for the connection to the posts of the casing. The ground sills made of nature stone or artificial stone are fragile, heavy and are placed and transported to the building site separately. The casings consisting of wooden posts -kept together by a coupling slit- and upper sill are then already fitted. Insofar as the artificial stone ground sills would be mounted to the casing beforehand the aforementioned unparallel location of the vertical planes of the ground sill -as a result of the tapered shape- would be a problem when placing and holding the casing and sill during the mounting operations.

The use of casings with one or several aluminium parts is also known. Aluminium has the advantage of being easily extruded, but the disadvantage of being expensive. Aluminium, moreover, is prone to attacks by cement and to damage.

In connection with the improvement of the accessibility of buildings it is strived for to create as few barriers as possible to humans who have difficulties walking and in particular people who move about with the help of rolling aids, such as a rollator or a wheelchair. It is desirable here that the threshold formed by the ground sill of a casing is so low that the wheels of the rollator or the wheelchair can easily roll past it. To that end the top surface of the ground sill has to be situated lower than has been usual up until now, namely -according to present standards- 2 cm higher at a maximum than the connecting surface of the ground surface (on the one hand) and the floor (on the other hand).

This can be achieved by having the posts extend further downwards and placing the ground sill lower. With wooden ground sills however, this has the drawback that the material is located closer to or deeper into the moist ground, and will also contact stagnant water over a larger part. Reducing the profile height is no solution because of the wanted strength.

Use of ground sills of nature stone or artificial stone located recessed could be a possibility, but that would entail the above-mentioned drawbacks. The formation of a cold bridge will also increase with a recessed location. Furthermore the mounting will be more difficult.

The invention now has the objective to improve on this and to that end provides a casing for a door or a window, which may or may not be provided with a moveable part, in which the casing comprises a ground sill, which is made of another material than the posts of the casing, the ground sill being made of poly olefin. This material is easy to work, in particular in a machining treatment, is relatively light, can be recycled, and can easily be made hardwearing. The formation of a cold bridge is ruled out. The ground sills, preferably solid, can be supplied to the joinery’s works in the wanted profile shape and with possible intermediate parts, such as plinth blocks, in order to be accommodated in a completely prefabricated casing, which is ready for transport to and arrangement at the building side.

The invention further relates to a ground sill construction for a door or a window, which may or may not be provided with a moveable part, comprising a ground sill and plinth blocks for the connection to the lower posts of a casing, characterised in that the plinth blocks are made of plastic, and the plinth blocks at the upper side being provided with a flexible sealing flashing for waterproof sealing of the lower side of the posts.

Preferably the ground sill and possibly the plinth blocks of the ground sill construction are made of a plastic, for instance poly olefin or pvc. Pvc is very suitable. Regarding pvc a construction of full core pvc should be thought of, for instance solid, or provided with a foamed core. In this way the ground sill and possibly the plinth blocks can be made by means of extrusion.

Poly olefin is preferred however, because of the above-mentioned advantages. In the following text the ground sill relates to the former ground sill as described with respect to the casing, and to the ground sill as described with respect to the ground sill construction.

Preferably the ground sill is made of a poly olefin having a molecular weight of between 150.10² and 4.10⁶, preferably 0.5.10⁶. Said material appeared to be very suitable and resistant to intensive use.

Preferably the poly olefin is a poly ethylene, preferably a material from the group formed by LLDPE, LLDPE, HMWPE and UHMWPE. Such polyethenes can be recycled very well, so that preferably such recycled material is included in the ground sill. The material is very suitable for use in the "Durable building" program in the Netherlands. The recycled material can in an advantageous manner -at last partly- consist of visible particles, which particles preferably have a different colour. Most
By ground sill is meant here the actual ground sill of an entrance opening, but also the ground sill of a fixed window, such a side-light near a door. The ground sill of the door opening is then in an advantageous manner extended in order to form the ground sill of an opening for fixed glazing situated adjacent to the casing. As a result the manufacturing of such an assembled casing is simple and wood is saved on.

At the location of the connection to the posts, the ground sill can be provided with plinth blocks, which preferably are made of the same material as the ground sill.

In construction work joints, in particular joints between casings and the surrounding construction, are usually sealed with a sealant. However this is not durable and not simple to apply. In the ground sill construction and the casing according to the invention a sealing is moreover necessary to stop rising dampness in the usually wooden posts. In the ground sill construction according to the invention it is preferred that the flashings of sealing material are arranged between the plinth blocks and the posts. To that end the invention also relates to a flashing for sealing joints and chinks in constructions, specifically for sealing connection joints between one casing part and the other and the remaining construction, the flashing being made of a flexible plastic having a closed cell structure, and an elongation strength to rupture which is higher than 120%.

Such a flashing serves for instance to stop vertically rising dampness in a ground sill construction and casing as described above. It appears to be important that the material of the flashing follows the wood grain well, and after pressing in returns slowly into the original position. In this way the wood appears to be sufficiently protected against rising dampness.

Preferably the water absorption of the flashing is lower than 10%.

Preferably the flashing has a pressure force at 40% of 8-12 N/cm², the flashing particularly has a tensile strength which is higher than 350 kPa, and more specifically has a pressure deviation 50 % 22 hours at 23°C of 6-10%. An even better sealing appears to be achieved as a result.

A flashing having an elongation strength to rupture higher than 140%, a water absorption lower or equal to 8%, a pressure force at 40% of 9-11 N/cm² and a pressure deviation 50% 22 hours at 23°C of 7-9% is even better. Optimized results are obtained with a flashing made of EPDM, of approximately 2-10 mm. In order to easily arrange the flashing it may be provided with an acrylate gluing.

The various characteristics are indicated according to the following standards:

Pressure force at 40%: DIN 53577
Pressure deviation 50 % 22 hour/23 degrees Celsius: ASTM D1056
Elongation strength to rupture and tensile strength: ISO 371977H.

By using the specific flashing it is possible to build the ground sill construction and the casing in a very durable manner. For instance this appeared during tests, such as fast wearing tests BRL0801 facade elements, as for instance carried out by SHR, Stichting Hout Research (Wood Research Foundation).

Here the construction including wooden posts is exposed to a test of 6 weeks. During this time cycles of two days of raining and subsequently two days of drying, after which exposure to -10 degrees Celsius, are repeated over and over again. The ground sill construction was not damaged then.

The harmful influence of moisture on the wooden posts is further counteracted, when the ground sill, the plinth blocks and the posts are connected to each other by means of screws, which screws are surrounded in the posts by plastic covers or plugs.

Rising dampness is further counteracted when for attachment of the screws in the posts use is made of so-called screw plugs or plugs that can be inserted otherwise. Also in the used situation said plugs shield screw itself from the wood, so that along the screw rising dampness cannot or hardly reach the wood. Preferably the plugs continue until through the ground sill, and more preferably a plastic or rubber ring is arranged between the screws and the plugs. As a result no water passes in the construction along the plugs or screws.

The invention additionally relates to a splashboard made of plastic, in particular made of the plastics already mentioned. As a result a durable construction is obtained, whereas no cold bridge is formed, as is common with the generally used concrete splashboards. Moreover such a splashboard is lightweight, so that it is simpler and cheaper to transport to the building site.

The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figure 1 shows a connection of a ground sill according to the invention to a post, in disassembled situation:

Figure 2 shows the connection of figure 1 in assembled situation, with an extended ground sill according to the invention;

Figure 3 shows a schematic view of the way in which the parts of figure 1 are attached to each other; and
The ground sill 1 shown in figure 1 is made of poly olefin, in particular a polyethylene, in particular of the material "Hollodeen", available from Kreunen Kunststoffen B.V. of Lochem, the Netherlands. Said material is easy to work in, in view of a machining treatment and in view of making attachment holes. The material having a molecular weight of 150.10^3 and 4.10^6, preferably 0.5.10^6, furthermore is very hardwearing and weather resistant. "Hollodeen" has a wearing value tested according to the "Sandslurry" testing method of 63% of the one of Steel ST 37.

The material of the ground sill may be entirely or partially recycled. For the sight particles of recycled, regenerated material may be included in the material. The material is easy to recycle, because no toxic substances are released when burned, at least not to a more disadvantageous degree in relation to what is released when burning wood. When burned mainly CO and H_2O arise.

The material of the ground sill is furthermore easy to make UV proof.

As already mentioned pvc could also possibly be used.

At the top side the ground sill 1 can in the usual manner be provided with a plane 5 which inclines downward to the outside and a threshold 6. The threshold 6 is provided with a recesses step 7, in which a draught preventer 8 is inserted that are almost closed at their top ends, the screw bolts 15a, 15b are fixed in the wood of the posts 2, hence the screw bolts 15a, 15b are then fixed to the tubes 14a, 14b which downwardly end into widened bore holes 19a, 19b. In a manner which is known per se, the screw bolts 15a, 15b are then fixed to the tubes or plugs 14a, 14b which are fixed in the wood of the posts 2 also in manner known per se. The screw bolts 15a, 15b are shielded from the wood by the plugs.

It can be seen that the bore holes 9a, 9b substantially have the same diameter as the screw bolts 15a, 15b but that the bore holes 18a, 18b are somewhat wider than the shank of the screw bolts 15a, 15b. The difference may be 2 mm, and makes it possible that the sill can slide a little in transverse direction with respect to the plinth block and thus with respect to the post 2. Influence of settings and temperature may be set off in this manner. It is advantageous here when resilient rings 17a, 17b are placed between the heads 16a, 16b of the bolts 15a, 15b, preferably plastic or possibly rubber rings. In this way the action of the screw bolts is set off and the construction can be made waterproof.

However the plinth block 3 is clamped to the post in a sliding fixed manner.

The sealing flashing 4 and the plastic tubes 14a, 14b prevent rising dampness from penetrating the inside of the wooden post 2. The use of sealing flashing 4 renders the application of a sealing joint with the help of putty superfluous, so that fitting the casing according to the invention is simplified at that point.

As shown in figure 2, the ground sill 1 need not be limited to the one of a door opening, but may further extend to adjacent the actual door casing, to form a ground sill of a casing for fixed glazing, which is a unity with the door casing. In figure 2 this is shown with the help of the double glazing pane 11, which at the lower side is kept in its place by means of a glazing bead 12 which may be made of the same material as the ground sill 1.

The entire casing assembly, with ground sill and plinth blocks, may be assembled at a joinery's works in a simple manner, so that the entire casing can be placed in the construction in one go. The ground sills 1 here are made into the wanted dimensions and shape beforehand, which may take place by means of a machining treatment and after that delivered to the joinery's works.

The recessed location of the ground sill 1 with respect to the state of the art is also shown in figure 2. The inclined plane 5 ends at the front side at ground surface 20 level, and at the rear side the floor 21 is shown. The difference in level between the inclined plane 5 and the top surface of the ground sill 6 on the one hand and the difference in level between the floor 21 and the top surface 6 of the ground sill is 20 mm or less, so that the ground sill 1 with respect to what is usual extends further into the ground. However this is no objection because the

Figure 4a and 4B show a splashboard.
material is moisture proof.

In figure 4A an example of a cross-section of a splashboard 50 is shown. In figure 4B the location of the splashboard 50 in a building construction is shown. It can be seen that the ground sill 1 rests on the splash board.

Claims

1. Ground sill construction for a door or a window, with may or may not be provided with a movable part, comprising posts (2), a ground sill (1) and plinth blocks (3) for connecting the posts to the ground sill, characterized in that the plinth blocks are made of plastic, and at their upper side they are provided with a flexible sealing flashing (4) for waterproof sealing of the lower side of the posts.

2. Ground sill construction according to claim 1, in which the plinth blocks (3) are made of polyolefine, preferably with a molecular weight between 150,000 and 4,000,000, preferably 0.5-10^6, wherein the material preferably is a polyethene, preferably from the group consisting of LDPE, LLDPE, HMWPE and UHMWPE, wherein the plinth blocks are preferably made of recycled material, wherein preferably at least a part of the recycled material consists of visible particles, which particles preferably have a different colour.

3. Ground sill construction according to claim 1, wherein the posts (2) are made of wood, preferably the ground sill is made of metal such as aluminium, provided with a synthetic coating layer, if so desired.

4. Ground sill construction according to claim 1, 2 or 3, wherein the seating blocks (3) are formed in a machining treatment.

5. Ground sill construction according to any of the preceding claims, in which the sealing flashing (4) is made of a flexible synthetic material with a closed cell structure, and an elongation strength to rupture of more than 120%, wherein the water absorption is preferably less than 10%, preferably the sealing flashing has a compressive force of 8-12 N/cm^2 at 40%, preferably a tensile strength of more than 350 kPa, preferably a pressure variation 50% 22 hours at 23 degrees C of 6-10%, preferably an elongation strength to rupture of more than 140%, preferably a water absorption of less than or equal to 8%, preferably a pressure force at 40% of 9-11 N/cm^2 and a pressure deviation 50% 22 hours at 23 degrees C of 7-9%, preferably the sealing flashing is made of EPDM-rubber.

6. Ground sill construction according to one of the preceding claims, in which the plinth blocks (3) are provided with means for shift-tight connection with the ground sill (1) and with the posts (2) of a casing, wherein in particular the ground sill (1) is provided with a continuous hole through the ground sill (1) and the plinth blocks (3).

7. Ground sill according to any of the preceding claims, in which the ground sill (1), the plinth blocks (3) and the posts (2) are interconnected by means of screws (15a, 15b), which screws in the posts are surrounded by synthetic cap cases (14a, 14b), such as screw plugs or cellular concrete plugs, wherein preferably the screws are used which are screwed into screw plugs or cellular concrete plugs, optionally with an external thread, which are themselves screwed into the wood of the posts, wherein in particular the screw plugs or cellular concrete plugs extend through the ground sill, and between the plugs and the screws flexible synthetic material or rubber rings (17a, 17b) are arranged.

8. Casing for a door or a window, provided with a movable component or otherwise, in which the casing comprises a ground sill (1) which is made of another material than the posts of the casing, wherein the ground sill (1) is made of polyolefine.

9. Connection of a wooden post (2) with a ground sill (1) of a casing, in which screws (15a, 15b) are used, which are screwed into screw plugs or gas concrete anchors with external thread, which are themselves screwed into the wood of the post.

10. Plinth blocks (3), apparently suitable for a ground sill construction according to any of the preceding claims.

11. Flashing (4) for sealing seams and chinks in constructions, specifically for sealing joints between casings and the remaining construction, wherein the flashing is made of a flexible synthetic material with a closed cell structure, and an elongation strength to rupture of more than 120%, wherein the water absorption is preferably less than 10%, preferably the sealing flashing has a pressure force of 8-12 N/cm^2 at 40%, preferably a tensile strength of more than 350 kPa, preferably a pressure deviation 50% 22 hours at 23 degrees C of 6-10%, preferably an elongation to rupture of more than 140%, preferably a water absorption of less than or equal to 8%, preferably a pressure force of 9-11 N/cm^2 at 40% and a pressure deviation 50% 22 hours at 23 degrees C of 7-9%.

12. Splashboard (50) for supporting a ground sill (1), provided with an edge which is adapted to the bottom side of a ground sill, wherein the splashboard is made of synthetic material, preferably of polyolefine,
preferably of polyethene, preferably of the group constituted by LDPE, LLDPE, HMWPE and UHMWPE.