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(54) **Casement window or framework for a fire resistant window**

(57) A casement window or framework for a fire-resistant window or a fire resistant door is **characterized in that:**

- the casement window or framework respectively comprises at least four hollow-chamber profiles based on PVC-U, as well as a fire resistant insert mounted in the casement window or framework respectively, more particularly a fire resistant glazing;
- the hollow-chamber profiles based on PVC-U comprise a central reinforcement chamber as well as further hollow chambers;

- the reinforcement chambers of the hollow-chamber profiles of the casement window or framework respectively comprise a metal reinforcement;
- the fire resistant insert is retained on all four sides on the outside and/or the inside in the area of the edge by a continuous metal mounting bracket extending over the relevant side, where
- the mounting brackets are tightened to the respective metal reinforcements in the reinforcement chambers of the hollow-chamber profiles.

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Description

[0001] The invention relates to a casement window or framework for a fire-resistant window based on hollow-chamber profiles made of PVC as well as a fire resistant insert, more particularly a fire resistant glazing.

Field of the invention.

[0002] Fire resistant windows and doors are generally made of steel profiles, because steel profiles have a considerably higher softening or melting temperature respectively compared to plastic profiles. Steel profiles, however, have a rather poor thermal insulation and are surpassed by plastic windows for optical reasons as well as reasons of cost of operational maintenance.

State of the art.

[0003] From DE 20 2066 44 U1 is known a fire resistant element based on plastic profiles, in which a grid-shaped and flexibly formed fire resistant element is inserted into the reinforcement chamber of the frame profile. However, a window of this type does not meet the customary minimum requirements as to fire resistance as tested in the F30 test.

[0004] From DE 202 08 44 U1 is known a fire retardant window or door jamb construction respectively based on polyethylenes as a material for the outer wall, where as a result of intumescent material in at least one hollow space in the profile an enhanced fire safety is to be achieved. This construction too is insufficient for the manufacture of windows and doors that are to withstand a higher fire load (for example F30) .

Object of the invention

[0005] It is an object of the present invention to provide a casement window or framework respectively for a fire resistant window or a fire resistant door respectively that shows enhanced durability.

Summary of the invention.

[0006] For the purpose of achieving this object the casement window or framework respectively for a fire resistant window according to the invention is characterised in that:

- the casement window or framework respectively comprises at least four hollow-chamber profiles based on PVC-U, as well as a fire resistant insert mounted in the casement window or framework respectively, more particularly a fire resistant glazing;
- the hollow-chamber profiles based on PVC-U comprise a central reinforcement chamber as well as further hollow chambers;
- the reinforcement chambers of the hollow-chamber

profiles of the casement window or framework respectively comprise a metal reinforcement;

- the fire resistant insert is retained on all four sides on the outside and/or the inside in the area of the edge by a continuous metal mounting bracket extending over the relevant side, where
- the mounting brackets are tightened to the respective metal reinforcements in the reinforcement chambers of the hollow-chamber profiles.

[0007] In the context of this description framework is understood to mean a frame with a fire resistant insert; a casement window is understood to mean a casement window with a fire resistant insert. The fire resistant insert is generally a fire resistant glazing as is in fact known per se by the person of skill in the art.

[0008] The essence of the invention is that the fire resistant insert in the area of the edge at any rate on the outside or on the inside but preferably on both sides, is retained by a continuous metal mounting bracket extending over the respective side, which mounting bracket extends at least as far as nearly the corner areas and - if need be - has only short interruptions. For it has turned out that mounting by means of a plurality of short brackets which are mounted rather far apart is not sufficient, because the fire resistant glazing is sagging considerably in the non-supported areas in the case of thermal loads that are customary in the event of a fire, so that fuel gases can penetrate from the side of the fire to the other side.

[0009] The preferably continuous mounting brackets according to the invention are all tightened to the metal reinforcements in the reinforcement chambers of the hollow chamber profiles, so that the considerable forces occurring in the case of fire can be moderated by the fire resistant glazing.

[0010] In a preferred embodiment of the invention the metal reinforcements in the hollow-chamber profiles in the corner areas are connected directly or indirectly to each other so as to form a fixed framework. To this end the corner brackets can be mounted in the rebate area between casement window and frame, which corner brackets are tightened particularly to the metal reinforcements. In another preferred embodiment of the invention metal corner brackets are mounted in the corner areas of the glass rebate area, which corner brackets are connected to the metal reinforcements in the hollow chamber profiles by means of bolts. This is in particular necessary with a fixed glazing because there is no rebate area present between frame and casement window.

[0011] All window furniture, reinforcement profiles, metal mounting brackets and metal corner brackets are preferably made of steel because injection mouldings usually do not possess sufficient thermal resistance. The window furniture is preferably equipped with mushroom-shaped interlocking so as to achieve sufficient anchorage in the square washers. The square washers are preferably secured to the metal reinforcements in the reinforcement chambers in order to transmit the necessary forces

in case of fire.

[0012] In yet another preferred embodiment of the invention fire resistant materials are inserted into the steel reinforcements in the reinforcement chambers of the hollow-chamber profiles, which materials are effective in that they have a cooling effect under the influence of heat - more specifically under the influence of the evaporation of crystalline-bound water - and furthermore possess good thermal resistant and antinoise properties. For this purpose for example Promaxon® or Promatect® plates may be used.

[0013] Furthermore, strips or bands respectively of intumescent materials, which are foaming under thermal load and also heat insulating, are applied in areas which are specifically at risk under thermal load. These intumescent materials are known for example under the trade name of Promaseal®.

Brief description of the drawings.

[0014] The following description relating to the appended drawings, the whole given by way of non-limiting example according to the invention, will provide better understanding of how the invention can be realised, in which:

Fig. 1 shows an inside view of a fire resistant window according to the invention;

Fig. 2 shows a vertical section AA through the window frame;

Fig. 3 shows a vertical section BB through the window jamb; and

Fig. 4 shows a vertical section DD or horizontal section CC respectively through the casement window and the window frame.

The best way to implement the invention

[0015] The inside view of the fire resistant window 1 shown in Fig. 1 has on the left-hand side a frame 2 with a fixed glazing 4 and on the right-hand side a tilt and turn window 3 with a fire resistant glazing 5. The window frame is formed by the three window frame profiles and the middle jamb profile. The vertical section AA is shown in enlarged form in Fig. 2. The window frame 2 has a typically Dutch deep design. The steel reinforcement 8 is mounted in customary fashion in the middle, large, elongated hollow chamber. With a high thermal load in case of fire the steel reinforcement 8 is cooled from within by the fitted fire resistant plate 15. Additional intumescent bands 16 in the reinforcement chamber, in the rebate area as well as the area of the wall connection, enhance protection against the penetration of fuel gases in case of fire.

[0016] In the rebate area in the window frame 2 a fire resistant glazing which is customary per se is used as a fixed glazing 4, which fixed glazing 4 is retained on the outside by the steel corner bracket 20 and on the inside

by the steel corner bracket 19. The steel corner brackets 19 and 20 extend over all four sides of the window over its entire length and are connected regular distances apart to the steel reinforcement 8 by means of the screwed joints 22 and 21 respectively - only referred to in the drawing figures. A stable supporting construction of steel corner brackets 20, 21 and steel reinforcements 8 is thus realised in case of fire. Additional steel corner brackets 30 are mounted in the corner areas of the window frame 2. These additional steel corner brackets 30 are also tightened to the steel reinforcements 8. On the outside the fixed glazing 4 is sealed with a sealant 10 to the frame profile. On the inside the fixed glazing 4 is retained by means of the glazing bead 7'.

[0017] In Fig. 3 is shown the cross section BB through the window frame 6 and the tilt and turn window 3. The frame 6 accommodates - as does the frame 2' - the fixed glazing 4, while this fixed glazing 4 is retained both on the inside and on the outside by a respective continuous steel corner bracket. On the outside the fixed glazing 4 is sealed with a sealant 10' to the frame profile. On the inside the fixed glazing 4 is retained by the glazing bead 7'. On the outside the tilt and turn window 3 is sealed to the window frame 6 with the bead sealant 11 and on the inside with the bead sealant 11'.

[0018] The steel corner brackets are connected to the steel reinforcement 9 on the inside by the screwed joint 21' and on the outside by the screwed joint 22'. In the rebate area 28 as well as the fixed glazing area and in the area of the casement window glazing are applied intumescent bands 16 at various locations, which bands form a foaming layer when a certain thermal load is reached and are sealing these areas so as to thwart the penetration of fuel gases.

[0019] In Fig. 4 is shown in enlarged form the horizontal cross section CC of Fig. 1 and the vertical cross section DD turned through 90 degrees respectively. The window frame 2 - as has already been shown with reference to Fig. 2 - here contains the steel reinforcement 8 in the steel chamber as well as various intumescent bands 16 in the rebate area 28. The sealing between the tilt and turn window 3 and the window frame 2 is provided on the outside by the bead sealant 11" all around and on the inside by the bead sealant 11'. In the steel chamber of the tilt and turn window 3 is used reinforcement steel 13 which is protected or cooled respectively on the inside by the fire resistant plate 14. In the glass rebate area 29 - similar to the fixture of the fixed glazing 4 to the window frame - there are steel corner brackets 17 on the outside and steel corner brackets 18 on the inside, the latter being tightened to the steel 13 of the tilt and turn window 3 by means of the respective screwed joints 23 and 24. The steel corner brackets 17 and 18 extend over the entire length of the four sides of the tilt and turn window and thus reliably retain the fire resistant glazing 5 when there is a fire.

[0020] Also the glass rebate area 29 is protected all around against the penetration of fuel gases by means

of various intumescent bands 16. The fire resistant glazing 5 is retained on the outside by the sealing 10" and on the inside by the glazing bead 7 with a fixedly extruded sealant. In the corner areas of the window (tilt and turn window 3) are mounted additional steel corner brackets 31. These steel corner brackets 31 are also tightened to the steel reinforcements 8.

[0021] The fixed glazing 4 and the fire resistant glazing 5 are mounted in the respective rebate area in a manner known per se by means of fire resistant glass blocks 27.

[0022] The fire resistant plate 25 is mounted all around between the window frame and the surrounding wall portion, which plate rests on the outside on the sealing 12 and on the inside is complemented by intumescent bands 16. In the Figs. 2 and 4 an additional fire resistant plate 26 is mounted on the inside in order to render the window frame 2 extra fire resistant.

least one of the further hollow chambers contains more particularly strip-like profiles of materials which are foaming and/or heat absorbing under the influence of heat.

Claims

1. A casement window or framework for a fire-resistant window or a fire resistant door, **characterised in that:**
 - the casement window or framework respectively comprises at least four hollow-chamber profiles based on PVC-U, as well as a fire resistant insert mounted in the casement window or framework respectively, more particularly a fire resistant glazing;
 - the hollow-chamber profiles based on PVC-U comprise a central reinforcement chamber as well as further hollow chambers;
 - the reinforcement chambers of the hollow-chamber profiles of the casement window or framework respectively comprise a metal reinforcement;
 - the fire resistant insert is retained on all four sides on the outside and/or the inside in the area of the edge by a continuous metal mounting bracket extending over the relevant side, where
 - the mounting brackets are tightened to the respective metal reinforcements in the reinforcement chambers of the hollow-chamber profiles.
2. A casement window or framework as claimed in claim 1, **characterised in that** the metal reinforcements of the hollow-chamber profiles in the corner areas are connected directly or indirectly to each other so as to form a fixed framework.
3. A casement window or framework as claimed in claim 2, **characterised in that** the corner brackets are mounted in the rebate area of the framework.
4. A casement window or framework as claimed in any one of the claims 1 to 3, **characterised in that** at



EUROPEAN SEARCH REPORT

Application Number
EP 09 17 3172

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 February 2010	Examiner Kofoed, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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