(57) Abrégé/Abstract:
The present invention is directed towards a window sill flashing comprising a base having a substantially rectangular shape. A front flange projects perpendicularly downward from a front edge of the base and at least one side flange extends vertically from a side edge of the base. The side flange includes a front surface. The window sill flashing is made from a rigid homopolymer vinyl film.
WINNOW SILL FLASHING

Abstract of the Disclosure

The present invention is directed towards a window sill flashing comprising a base having a substantially rectangular shape. A front flange projects perpendicularly downward from a front edge of the base and at least one side flange extends vertically from a side edge of the base. The side flange includes a front surface. The window sill flashing is made from a rigid homopolymer vinyl film.
66330-0025

WINDOW SILL FLASHING

Technical Field

[0001] The present invention generally relates to building materials and more particularly relates to window sill flashing for a window frame to prevent the ingress of water.

Background of the Invention

[0002] Typical wall construction techniques include forming a rough opening from framing members such that a window opening is formed. The bottom portion of the window opening (called the sill) is susceptible to rotting if water is not prevented from penetrating from around the window perimeter. Additionally, adjacent ceilings, plastered walls, and the like are susceptible to damage if rain-water infiltrates under the window sill.

[0003] Many systems are used to solve the problem of water intrusion. One method includes providing a means to collect and control the water that does infiltrate the window perimeter. Alternatively, surface sealing agents, such as caulk, expanding foam, and the like are used as filling agents to fill openings between the periphery of the window and the adjacent, wall surfaces. However, over time, the filling agents have a tendency to dry, crack and shrink, thereby exposing gaps which provide a passageway for water to infiltrate the window perimeter.

Summary of the Invention

[0004] The present invention is directed towards a window sill flashing comprising a base having a substantially rectangular shape. A front flange projects perpendicularly downward from a front edge of the base and at least one side flange extends vertically from a side edge of the base. The side flange includes a front surface. The window sill flashing is made from a vacuum formed, rigid homopolymer vinyl film.

Brief Description of the Drawings

[0005] Figure 1 is an isometric view of a wall having a window opening and a flashing according to an embodiment of the present invention.
66330-0025

[0006] Figure 2 is an isometric view of a flashing and window assembly according to an embodiment of the present invention.

[0007] Figure 3 is a cross-sectional view taken along line 3-3 of Figure 2.

[0008] Figure 4 is an isometric view of the flashing and window assembly according to an alternate embodiment of the present invention.

[0009] Figure 5 is a cross-sectional view taken along line 5-5 of Figure 4.

[0010] Figure 6 is an isometric view of the flashing according to yet another alternate embodiment of the present invention.

[0011] Figure 7 is a cross-sectional view taken along line 7-7 of Figure 6.

[0012] Figure 8 is an isometric view of the flashing according to still yet another alternate embodiment of the present invention.

[0013] Figure 9 is a cross-sectional view taken along line 9-9 of Figure 8.

[0014] Figure 10 is a perspective view of a wall having a window opening covered with housewrap.

[0015] Figure 11 is a perspective view of a wall having a window opening with the housewrap folded to the proper positions for window installation.

[0016] Figure 12 is a perspective view of a wall having a window opening with a first portion of the flashing of the present invention installed.

[0017] Figure 13 is a perspective view of a wall having a window opening with a second portion of the flashing installed.

[0018] Figure 14 is a perspective view of a wall having a window opening with two flashing portions taped according to an embodiment of the present invention.

**Detailed Description**

[0019] Referring to Figure 1, a window sill flashing (hereinafter referred to as "flashing") 10 is generally shown according to an embodiment of the present invention. The flashing 10 is formed to fit within and snugly conform to a bottom portion 12 of a window opening 14 of a wall 15. Window opening 14 has a width W and is adapted to accept a window assembly 13. As illustrated, the face portion (or flange) 22 of flashing 10 is generally U-shaped and constructed as one piece. The flashing 10 comprises a base 16, a first side flange 18 integrally formed with base 16 at one end, a second side flange 20 integrally formed with base 16 at an opposite end, and a front flange 22 integrally
formed with base 16. Preferably base 16, side flanges 18, 20 and front flange 22 are all vacuum formed from a common sheet. Front (U-shaped) flange 22 extends perpendicularly downward from an edge of base 16. First side flange 18 includes a front surface 18a and second side flange 20 includes a front surface 20a. The flashing 10 is glued, calked, taped, or otherwise permanently secured within window opening 14. It is contemplated that flashing 10 of Figure 1 is formed in various standard size lengths and widths to accommodate various standard window openings 14 and wall thicknesses.

Figures 2 and 3 illustrate a first alternative embodiment of the flashing of Figure 1, wherein like features are indicated by the same reference number. Flashing 10a is fabricated as two separate portions 10a' and 10a''. Portions 10a' and 10a'' form the left and right side of flashing 10. Alternatively, flashing 10a is fabricated as a one piece member with a length (prior to cutting) that spans beyond the width W of window opening 14. Prior to installation of flashing 10a into window opening 14, flashing 10a is cut, resulting in portions of flashings 10a' and 10a''. It can be appreciated that flashing 10a may be cut at any point along its length, so long as flashings 10a' and 10a'' fit within window opening 14. Thereafter, portions 10a' and 10a'' are placed so that they partially overlap one another in a region 24 producing flashing 10a having length L that is generally equal to the width W of window opening 14. Figure 3 is a cross-sectional view of the overlap region 24 of portions 10a' and 10a''. One advantage of flashing 10a is that flashing 10a may be cut to size in the field to accommodate any width W of window opening 14.

Figures 4 and 5 illustrate a further alternate embodiment of the flashing of the present invention. Flashing 10b is similar to flashing 10 and flashing 10a, except portions of flashing 10b' and 10b'' do not overlap at region 24. Instead, portions 10b' and 10b'' are separated by a gap 26. As illustrated, gap 26 is narrow relative to the width W of window opening 14. However, it can be appreciated that gap 26 may be any desired length. For instance, gap 26 may expose a substantial portion of width W of window opening 14. Further, gap 26 may be optionally covered with a sill flashing cap 28.

Figures 6 and 7 illustrate a further embodiment of the flashing of the present invention. Flashing 10c is substantially similar to flashing 10a; however, flashing 10c includes a rear, vertical rising wall 30 to further impede the ingress of water. Rear,
vertical rising wall 30 is located along an edge of base 16, opposite of front flange 22 and extends perpendicularly upward from base 16.

[00023] Figures 8 and 9 illustrate yet another embodiment of the flashing of the present invention. Flashing 10d is substantially similar to flashing 10b; however, flashing 10b includes rear, vertical rising wall 30.

[00024] Figures 10-14 illustrate the steps for installing flashing 10 within window opening 14. Initially, the window opening 14 is covered with housewrap 32. Housewrap 32 is then cut along perforated lines 34. Perforated lines 34 divide housewrap 32 into upper section 32a, lower section 32b, left side 32c and right side 32d. The lower section 32b and left and right sides 32c, 32d of housewrap 32 are folded inwardly, towards the interior surface of wall 15. Upper section 32a is rolled up towards the exterior of wall 15, in the direction of arrows A (see Figure 11). Thereafter, flashing 10 or portions of flashing 10a”, 10b”, 10c” or 10d” are placed on top of bottom portion 12 of window opening 14 (see Figure 12). Figures 13 illustrate flashing portions 10a’, 10b’, 10c’, or 10d’ being placed along bottom portion 12. Finally, flashing 10 is secured to bottom portion 12. Figure 14 illustrates flashing 10 being secured to bottom portion 12 with adhesive tape 36. Adhesive tape 36 is also used to seal the seam created by the overlap 24 between right and left portions of the flashing 10. Where there is no overlap 24, adhesive tape 36 may be used to cover the bottom portion 12 of window opening 14. Thereafter, a window 13 is installed within window opening 14.

[00025] The flashing 10 of the present invention is preferably manufactured from sheets of thermoforming film, such as a rigid homopolymer vinyl film, or polyvinyl chloride (PVC), or the like. The preferable material properties for flashing 10 are listed in the table below:

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge Range</td>
<td>Mils</td>
<td>7.5-35</td>
</tr>
<tr>
<td>Gauge Tolerance</td>
<td>%</td>
<td>±5</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>--</td>
<td>1.33</td>
</tr>
</tbody>
</table>

4
| Material Yield (Nominal) | in.²/lb. | 2770 (7.5 mil)  
2080 (10.0 mil)  
1390 (15.0 mil)  
1040 (20.0 mil) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength (Yield)</td>
<td>lb./ in.²</td>
<td>6600</td>
</tr>
<tr>
<td>Elongation (Break)</td>
<td>%</td>
<td>180</td>
</tr>
<tr>
<td>Tensile Impact Strength</td>
<td>ft-lb./ in.²</td>
<td>275</td>
</tr>
<tr>
<td>Cold Break Temperature</td>
<td>°C</td>
<td>-30</td>
</tr>
<tr>
<td>Heat Deflection Temperature at 264 psi</td>
<td>°F</td>
<td>162</td>
</tr>
<tr>
<td>Gloss</td>
<td>%</td>
<td>115</td>
</tr>
</tbody>
</table>

It can be appreciated that the flashing 10 may be covered with a silicone coating for ease of manufacturing and separation of the flashing 10 and for ease in installation of window assembly 13.

[00026] Flashing 10 is preferably fabricated using vacuum forming techniques. Vacuum forming flashing 10 from thin gage material allows the first and second side flanges 18, 20 to be substantially perpendicular to base 16. The material properties, including the material thickness, provides flexibility to flashing 10, thus allowing the vacuum forming dies to separate from the flashing 10 once the vacuum forming process is completed. Additionally, vacuum forming flashing 10 allows the material to have a minimum thickness (as thin as 7.5 mm). Therefore, when portions of flashing 10 overlap, the resultant gap under the flashing 10 is minimal and does not allow water intrusions.

[00027] Due to the geometry and thinness of flashing 10, flashing 10 cannot be manufactured using an injection molding process. If flashing 10 were to be manufactured by injection molding, the minimum thickness feasible for flashing 10 is 40 mm, significantly higher than the practical thickness of flashing 10 formed by the vacuum forming process. Moreover, to maintain the perpendicularity of surfaces 16, 18, 20 and 22 over the depth of base 16, flashing 10 would require ribs, or support struts, to be molded into base 16. These ribs would detract from the functionality of flashing 10. Furthermore, it would be necessary to include ports along base 16 to ensure that sufficient material flows across and covers the entire base 16. These ports would give rise to dimples, or other imperfections in the surface of base 16. The imperfections could create
gaps or openings along the window sill, thereby comprising the water impermeability of flashing 10. Even with the use of ports along base 16, obtaining complete flow coverage of injected material is problematic because the preferred depth of base 16 is in the range of 1 ¼ inches to 3 ¼ inches.

[00028] The flashing embodiments of the present invention are configured to fit numerous sized window openings. The flashing may be configured to fit window openings up to 65 inches wide or even up to 9 feet wide. Also, it is contemplated that the base may have a height of 4.5 inches. The rear vertical wall, if used, may have a height of 0.25 inches. The thickness of the sill flashing material may be in the range of 0.010 inches, but thinner material in the range of 0.006 inches is also contemplated. The flashing is not limited to plastic material, but can be also aluminum.

[00029] The embodiments disclosed herein have been discussed for the purpose of familiarizing the reader with novel aspects of the invention. Although preferred embodiments of the invention have been shown and described, many changes, modifications and substitutions may be made by one having ordinary skill in the art without necessarily departing from the spirit and scope of the invention as described in the following claims.
WHAT IS CLAIMED IS:

1. A window sill flashing comprising:
   a thin gauge plastic vacuum formed film member, the member being formed for including:
   a substantially rectangular shaped base portion including a front edge, a rear edge and two opposing side edges;
   at least one side flange extending substantially perpendicular from one of the side edges of said base portion and integrally formed therewith;
   a front surface integrally formed with the base portion and which extends substantially perpendicular from the front edge of said base portion; and
   a front surface integrally formed with the side flange and which extends substantially perpendicular from a front edge of side flange,
   wherein the front surfaces of the base portion and the at least one side flange are integrally formed together to create a continuous surface.

2. The window sill flashing of claim 1, wherein a first and second side flange extend substantially perpendicular from the opposing said side edges of said base portion.

3. The window sill flashing of claim 1, wherein the member has a thickness of 7.5-35 mm.

4. The window sill flashing of claim 3, wherein the base portion has a depth of 1 to 3-1/4 inches relative to said front edge of said base portion.

5. The window sill flashing of claim 1, wherein the member further comprises a rear wall extending substantially perpendicular from the rear edge of the base portion.

6. The window sill flashing of claim 3, wherein the member further comprises a rear wall extending substantially perpendicular from the rear edge of the base portion.

7. The window sill flashing of claim 4, wherein the member further comprises a rear wall extending substantially perpendicular from the rear edge of the base portion.

8. The window sill flashing of claim 2, wherein the member is vacuum formed, further comprises a rear wall extending substantially perpendicular from the rear edge of the base portion and wherein the member has a thickness of about 7.5-35 mm.
9. The window sill flashing of claim 1, wherein the material of the member comprises vinyl.

10. The window sill flashing of claim 1, wherein the member includes a silicone coating for ease of manufacturing and separation of the flashing or for ease in installation of a window assembly.

11. The window sill flashing of claim 1, wherein the base portion has a width of 4.5 inches.

12. A window sill flashing assembly, comprising:
   a thin gauge one piece plastic film member, the member including:
   a substantially rectangular shaped base portion including a front edge, a rear edge and at least one side edges;
   a first side flange extending substantially perpendicular from the at least one first side edge of said base portion;
   a rear wall extending substantially perpendicular from the rear edge of the base portion;
   a front surface integrally formed with the base portion and which extends substantially perpendicular from the front edge of said base portion; and
   a front surface integrally formed with the first, second or both side flanges and which extends substantially perpendicular from a front edge of the side flange,
   wherein the front surfaces of the base portion and the side flanges are integrally formed together to create a continuous surface.

13. The assembly of claim 12, wherein the one piece member includes a second side flange extending substantially perpendicular from a side edge of the base portion opposite the first side edge, and the member is cut into separate portions, each portion including one of said side flanges and being adapted for placement at opposite corners of a window frame opening.

14. The assembly of claim 12, wherein the width of the base is 4.5 inches.

15. The assembly of claim 13, wherein the width of the base is 4.5 inches.

16. The assembly of claim 12, wherein the one piece member has a thickness of about 7.5-35 mm.
17. The assembly of claim 13, wherein the material of the one piece member comprises vinyl.

18. The assembly of claim 13, further comprising a housewrap placed between the separate portions and the window frame opening.

19. The assembly of claim 9, wherein the material of the member is polyvinylchloride.

20. The assembly of claim 17, wherein the material of the member is polyvinylchloride.

21. The assembly of claim 20, further comprising a silicone coating.

22. A window sill flashing, comprising:
   a base having a substantially rectangular shape; a front flange projecting perpendicularly downward from a front edge of said base;
   at least one side flange extending vertically from a side edge of said base, said at least one side flange including a front surface; and
   wherein said window sill flashing made from a sheet of rigid homopolymer vinyl.

23. A window frame assembly for a building, the window frame assembly comprising:
   an opening formed in a wall portion adapted for receiving a window assembly, the opening including at least two corners located at opposite sides of the opening;
   at least two vacuum formed members located at the at least two corners, the members including a base, and first and second side flanges, with said side flanges extending from opposing side edges of said base, said side flanges including a front surface; and
   a cap extending between the at least two vacuum formed members.

24. The assembly of claim 23, wherein the base of the at least two vacuum formed members includes a depth of 1 to 3 1/4 inches.

25. The assembly of claim 23, wherein the at least two vacuum formed members comprise a thin gage material having a thickness in the range of 7.5-35 mm.

26. The assembly of claim 24, wherein the at least two vacuum formed members comprise a thin gage material having a thickness in the range of 7.5-35 mm.

27. The assembly of claim 23, wherein the material of the at least two vacuum formed members comprise vinyl.
28. The assembly of claim 23, further comprising a wrap placed about the opening formed in
the wall and extending at least partially therein.

29. The assembly of claim 28, wherein the wrap is placed below the at least two vacuum
formed members and cap.

30. The assembly of claim 23, further comprising an adhesive for attachment of the cap to the at
least two vacuum formed members.

31. The assembly of claim 23, further comprising an adhesive located between the at least
two vacuum formed members and the wall forming the opening.

32. The assembly of claim 23, wherein the at least two vacuum formed members further
comprises a rear wall projecting upwardly from a rear edge of said base.

33. The assembly of claim 23, wherein the first and second side flanges are substantially
perpendicular to the base.

34. The assembly of claim 23, wherein the at least two vacuum formed members include a
coating for ease of manufacturing and separation of the flashing or for ease in installation of the
window assembly.

35. A method of forming a window frame assembly for a building, the method including the
steps:

forming an opening in a wall portion for receiving a window assembly, the opening
including two opposing corners located at opposite sides of the opening;

providing a one piece molded plastic member that includes a base, and first and second
side flanges, with said side flanges extending from opposing side edges of said base, said side
flanges including a front surface, and wherein said first and second side flanges are
substantially perpendicular to the base;

cutting the one piece member to form at least two corner pieces adapted for placement
at the two opposing corners formed by the opening, wherein said two corner pieces include a
rear wall projecting upwardly from a rear edge of said base;

attaching the two corner pieces to the two opposing corners, wherein upon attachment a
gap is formed between the two corner pieces; and

covering the gap between the two corner pieces.
36. The method of claim 35, further comprising the step of applying a wrap to the wall portion for providing protection to the same, wherein the wrap extends at least partially within the opening.

37. The method of claim 35, wherein the base is vacuum drawn to a depth of 1 to 3 1/4 inches.

38. The method of claim 35, further comprising the step of adhesively bonding the cap to the at least two corner pieces.

39. The method of claim 35, wherein the one piece plastic member comprise a thin gage material having a thickness in the range of 7.5-35 mm.

40. The method of claim 37, wherein the one piece plastic member comprise a thin gage material having a thickness in the range of 7.5-35 mm.

41. The method of claim 35, wherein the thin gage material comprises vinyl.

42. The method of claim 35, wherein the attaching step includes a step of fastening.

43. A window sill flashing, comprising:
   a thin one piece molded plastic member, the member including:
   a rectangular shaped base portion;
   at least one side flange wherein said side flange extends upwardly and substantially perpendicular from a side edge of said base portion and includes a front surface,
   a rear wall extends upwardly and substantially perpendicular from a rear edge of said base portion; and
   wherein the base portion is molded to a depth of 1 to 3 1/4 inches with respect to the at least one side flange.

44. The flashing of claim 43, wherein the thin one piece molded plastic member comprises a thin gage material having a thickness in the range of 7.5-35 mm.

45. The flashing of claim 44, wherein the width of the base portion is 4.5 inches.
46. The flashing of claim 43, wherein the thin one piece molded plastic member includes a coating for ease of manufacturing or for ease in installation of a window frame assembly.

47. The flashing of claim 43, wherein the thin one piece molded plastic member is formed through a vacuum forming technique.

48. A method of making the window sill flashing of any one of claims 1 to 11 comprising vacuum forming the thin gauge plastic.

49. A method of making the window sill flashing assembly of any one of claims 12 to 21 comprising vacuum forming the thin gauge one piece plastic member.
FIG. 12
FIG. 13

10a', 10b', 10c', 10d'

10a'', 10b'', 10c'', 10d''

INTERIOR SURFACE OF WALL 15

EXTERIOR SURFACE OF WALL 15

32a

14

24