An exterior panel system is disclosed. The exterior panel system has at least one panel having a main surface and at least one panel side wall. The system has at least one gutter having gutter surface and at least one gutter side wall. The system has a lower receiver configured to join the panel and the gutter to an exterior wall. The panel is located adjacent the gutter and the at least one panel side wall located adjacent to the gutter surface and adjacent to at least one gutter side wall. The exterior panel system is capable of providing water proofing or water resistance to the exterior of a building utilizing dry joins that do not require the use of seals or expandable sealant during installation.
EXTERIOR PANEL SYSTEM

FIELD OF THE INVENTION

[0001] The invention relates to systems for protecting and beautifying the exterior of a building.

BACKGROUND OF THE INVENTION

[0002] It is known to provide covering systems to overlay the exterior surface of a building. Such systems may be utilized to provide protection, such as protection from weather as well as water resistance, to the exterior of the building and/or to provide an aesthetically pleasing exterior appearance to the building. Exterior covering systems have been known to employ a number of panels mounted to the exterior of the building.

[0003] Some prior art panel systems utilize panels that require the use of sealant during panel installation. The present inventor has recognized that the use of sealant during the installation of exterior panel system is disadvantageous, because sealants create additional cost and work during installation and repair, sealants deteriorate over time and need replacing, sealants restrict the ability of the covering system to be partially dismantled for maintenance of the building or the panel system. In addition, liquid or expandable sealants can be messy to deploy. Further systems that require the use of sealants introduce the possibility that the sealants will be incompletely or incorrectly applied or installed and as such will result in a system that has sub-optimal water and weather resistance. The present inventor recognized the need for a panel system that utilized dry joints that do not require seals or sealant to achieve water and weather resistance. The present inventor recognized the need for a dry joint system that prevents the infiltration of water behind the panel system.

[0004] Some prior art panel systems utilize methods and mechanisms of connecting panels that do not allow a panel, which is not located at an edge of the system, to be removed without the necessity of removing all or some of the adjacent panels in a particular direction toward an edge. The present inventor has recognized a need for a system that provides panels that can be individually removed without the necessity of completely removing adjacent panels from the system.

[0005] Some prior art panel systems utilize gutters that run behind panels for the vertical length of the building, or the vertical length of the panels utilized in the system. The present inventor recognized that the longer amount of time that water is spent behind the panels, such as by retaining the water behind the panels for the entire vertical length, or a substantial portion thereof, the more likely that water will improperly escape the gutter within the panel system. The present inventor has recognized the need to provide a system where the gutters quickly expel water from behind the panel. The present inventor has recognized the need for a system where the gutter runs the length of the adjacent panel and the gutter expels the water to the exterior of the next lower panel or gutter thereby reducing the chance that water will improperly escape from the gutter and contaminate the area behind the panels.

SUMMARY OF THE INVENTION

[0006] An exterior panel system is disclosed. The exterior panel system has at least one panel having a main surface and at least one panel side wall. The system has at least one gutter having a gutter surface and at least one gutter side wall. The system has a lower receiver configured to join the panel and the gutter to an exterior wall. The panel is located adjacent the gutter and the at least one panel side wall is located adjacent to the gutter surface and adjacent to at least one gutter side wall.

[0007] The panel has a lower panel lip. The gutter has a lower lip. The lower gutter lip and the bottom panel lip each are configured to be received in the lower receiver.

[0008] In some embodiments, the panel is a first panel and the system has a second panel identical to the first panel. Each of the first and second panels have an upper recessed surface and a top lip receiver. The upper recessed surface extends above the main surface and is recessed from the main surface. The top lip receiver is located adjacent the recessed surface to create a receiving gap there between. The lower receiver is the top lip receiver of the second panel and the lower gutter lip and the bottom panel lip are received in the receiving gap.

[0009] In some embodiments, the at least one panel side wall comprises at least two panel side walls on opposite sides of the main surface. The at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter surface. At least one of the two panel side walls are located between the gutter side walls. At least one of the two gutter side walls is located between the panel side walls.

[0010] In some embodiments, an overlap space exists along the gutter surface between at least one panel side wall and one gutter side wall.

[0011] In some embodiments, the panel has a bottom wall. The bottom wall has at least one weep opening. At least a portion of the gutter surface directs water to the weep opening. At least a portion of the gutter surface is angled forward to direct water to the weep opening and out from behind the panel.

[0012] In some embodiments the gutter has at least one blocking wall extending from a rear surface of the gutter. The blocking wall is configured to disturb or stop the circulation of air behind the exterior panel system.

[0013] In some embodiments, the panel has a bottom wall and a vent wall extending from the bottom wall. The vent wall has a pressure equalizing vent opening.

[0014] In some embodiments, the panel is a first panel and the system comprises a second panel identical to the first panel. The gutter is configured to be positioned between the first and second panels. The at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter surface. The at least one panel side wall of each of the first and second panels is located between the at least two gutter side walls to form a gutter path.

[0015] A dry joint for an exterior panel system is also disclosed. The dry joint has a panel having a main surface, at least one panel side wall, a gutter having a gutter surface and at least one gutter side wall, and a lower receiver joining the panel and the gutter to an exterior wall. The panel is located adjacent the gutter and the at least one panel side wall overlaps the at least one gutter side wall.

[0016] In some embodiments, the at least one panel side wall contacts the at least one gutter side wall at the point of overlap.

[0017] In some embodiments, the at least one panel side wall is spaced apart from the at least one gutter side wall to create an overlap area between the at least one panel side wall and the at least one gutter side wall.

[0018] A method of expelling water from behind a panel of an exterior panel system is disclosed. The method comprises
providing a gutter located behind a portion of a first panel of an exterior panel system. Then directing water caught in the gutter behind the first panel through a panel weep hole in a bottom surface of the first panel on to an exterior surface of a second panel of the exterior panel system located below the gutter.

0019 It will be observed that any number of panels and gutters extending in either or both of the horizontal and vertical directions can be deployed in an arrangement of the panel system of the invention as more fully explained below.

0020 Further the panel system disclosed can act as a rain screen for the external surface or surfaces of a building. The panel system can also act as a pressure equalized rain screen for the external surface or surfaces of a building. The exterior panel system is capable of providing proofing or water resistance to the exterior of a building utilizing dry joints that do not require the use of seals or expandable sealant during installation.

0021 Numerous other advantages and features of the present invention will become readily apparent from the following detailed description of the invention and the embodiments thereof, from the claims and from the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

0022 FIG. 1 is a perspective view of a panel system of the invention in a first arrangement.

0023 FIG. 2 is a perspective view of the panel system of FIG. 1 in a second arrangement.

0024 FIG. 3 is a perspective view of the panel system of FIG. 2 with certain components shown in an exploded format and certain portions of components not shown.

0025 FIG. 4 is a perspective view of the panel system of FIG. 1 in a third arrangement.

0026 FIG. 5 is a perspective transparent view of a first embodiment panel of the panel system of FIG. 1.

0027 FIG. 6 is a side view of the panel of FIG. 5.

0028 FIG. 7 is an enlarged side view of a portion of the panel taken from FIG. 6.

0029 FIG. 8 is a bottom view of the panel of FIG. 5.

0030 FIG. 9 is a perspective transparent view of a first embodiment gutter of the panel system of FIG. 1.

0031 FIG. 10 is a side view of the gutter of FIG. 9.

0032 FIG. 11 is a front view of the gutter of FIG. 9.

0033 FIG. 12 is a bottom view of the gutter of FIG. 9.

0034 FIG. 13 is a top view of the gutter of FIG. 9.

0035 FIG. 14 is a side view of the panel system mounted or an external wall.

0036 FIG. 15A is an enlarged side section view of the connection of two panels of the panel system taken along line 15A-15A from FIG. 17.

0037 FIG. 15B is an enlarged side section view of the connection of two panels of the panel system taken along line 15B-15B from FIG. 17.

0038 FIG. 16 is a top view of the two adjacent panels and a gutter of the panel system of the arrangement of FIG. 2.

0039 FIG. 17 is a top view of the two adjacent panels taken along line 17-17 from FIG. 14 FIG. 1.

0040 FIG. 18 is a side view of a portion of the panel system of FIG. 1 with a cover system.

0041 FIG. 19 is a perspective view of a second embodiment of the panel system with certain components shown in an exploded format and certain portions of components not shown.

0042 FIG. 20 is a side view of a second embodiment panel of the panel system of FIG. 19.

0043 FIG. 21 is an enlarged side view of a portion of the panel taken from FIG. 20.

0044 FIG. 22 is a perspective transparent view of a second embodiment gutter of the panel system of FIG. 19.

0045 FIG. 23 is a front view of the gutter of FIG. 22.

0046 FIG. 24 is a side view of the panel system having the second embodiment panels and second embodiment gutters shown mounted to an external wall.

0047 FIG. 25 is an enlarged side view of the connection of two panels of the panel system taken from FIG. 24.

0048 FIG. 26 is a side view of a third embodiment panel system having third embodiment panels and second embodiment gutters shown mounted to an external wall.

0049 FIG. 27 is a perspective view of a third embodiment gutter of the panel system.

0050 FIG. 28 is a side view of a fourth embodiment panel of the panel system.

0051 FIG. 29 is an enlarged side view of a portion of a fifth embodiment panel of the panel system.

0052 FIG. 30 is a rear perspective view of a portion of a sixth embodiment panel of the panel system.

0053 FIG. 31 is a side view of a portion of the panel of FIG. 30.

0054 FIG. 32 is a rear view of a portion of the panel of FIG. 31.

DETAILED DESCRIPTION

0055 While this invention is susceptible of embodiment in many different forms, there are shown in the drawings, and will be described herein in detail, specific embodiments thereof with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the specific embodiments illustrated.

0056 An exterior panel system 100 for protecting and beautifying the exterior of a building is disclosed. The panel system 100 comprises at least one panel 110 and at least one gutter 160. The panel system can be implemented as a dry joint system where a seal, such as a rubber or silicon seal, is not required between the panel and the gutter. FIG. 1 shows one arrangement of the panel system having panels 110, 111, 112, 113, 114, 115, 116, 117, 118 and gutters 163, 164, 162, 160, 161, 165, 166, 167, 168, 169, 170, 171. Each of the panels 110, 111, 112, 113, 114, 115, 116, 117, 118 are identical. Each of the gutters 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171 are identical. A gutter is located between horizontally adjacent panel. Each panel is adjacent another panel in the horizontal direction.

0057 FIG. 2 shows a second arrangement of the panel system where the each laterally adjacent panel is located closer to the next laterally adjacent panel than in the arrangement of FIG. 1. Gutters 160, 161, 165, 166, 167, and 168 are located between laterally adjacent panels 110 and 113, 111 and 114, 112 and 115, 113 and 116, 114 and 117, 115 and 118 respectively in the arrangement of FIG. 2. A partially exploded view of the arrangement of FIG. 2 is shown in FIG. 3.

0058 FIG. 4 shows a third arrangement of the panel system. In the arrangement of FIG. 4, vertically adjacent gutters and panels are not aligned, but are offset laterally.

0059 FIGS. 5-8 show the first embodiment panel 110. FIG. 5 provides a transparent view of panel 110. The panel
110 has a main face 132, sides walls 130, 134, a bottom wall 152, a first step 138, a first recessed face 136, and wall mounting flange 140. The sides 130, 134 extend reward from the main face 132 and from the recessed face 136. The bottom wall 152 joins with the main face 132, and the side 130, 134 to form a semi-enclosed space behind the main face 132 and the recessed face 136.

[0060] As shown in FIG. 6, the main face 132 extends vertically to the first step 138. The first step 138 extends rearward to the recessed face 136. The recessed face 136 extends upward to the mounting flange 140. The mounting flange comprises a second recessed surface 146 extending downward to a second step 148. The second step 148 connects with an upper receiver lip 149.

[0061] The first recess face 136 extends upward to join with a lower step portion 142 that connects with a back plate portion 144. The second recessed surface 146 is flush with the back plate portion 144. In some embodiments, mounting openings are provided at the mounting marks 143 provided on the second recessed surface 146. The second recessed surface 146 joins the back plate portion 144 at a top point 147. In some embodiments, the lower step portion 142, the back plate portion 144, the top point 147, the second recessed surface 146, the second step 148, and the upper receiver lip 149 are made of a unitary piece of material which is bent to form the various portions and surfaces. The upper receiver lip 149 is spaced apart from the recessed face 136 along an upper portion 137 of the recessed face 136 to provide a lip gap 150.

[0062] There is a gutter gap 141 between upper edge 130a of the side 130 and the lower step portion 142. The same is provided on side 134 as shown in FIG. 5.

[0063] At a bottom end of the main face 132, opposite the first step 138, is the bottom wall 152. The bottom wall extends reward from the main face 132. The bottom wall 152 has at least two weep holes 158 as shown in FIGS. 7 and 8. At least one weep hole is located adjacent to each of the sides 130, 134. A lower hook 154 extends upward from the rear edge of the bottom wall. The lower hook 154 has a panel emboss or recess 156 on the rear face of the lower hook 154 and a protrusion 155 on the front face of the lower hook 154 opposite the recess 156. The protrusions 155 allow for a snug fit of the lower hook 154 into the lip gap 150.

[0064] The weep holes may also allow for pressure equalization between air on the outside of the panel system an air behind the panel system. In some embodiments, the weeps holes are provided in a sufficient number and size to achieve the desired rate or speed of pressure equalization. In some embodiments, weep hole are located at every 6 to 12 inches along the bottom wall 152 of the panel. In some embodiments, the weeps holes are slots.

[0065] The panel 110 can be formed from a unitary piece of material, such as sheet metal, stainless steel, aluminum, composite aluminum or the like, which is cut, trimmed, and folded to form the panel 110. In one embodiment, the panel is made of sheet metal having a thickness of or between 0.030 and 0.125 inches. In one embodiment, the panel is made of composite aluminum of or between 4 and 6 millimeters.

[0066] FIGS. 9-13 illustrate a first embodiment of the gutter 160. The gutter 160 has a gutter surface 183. The gutter surface comprises an angled main surface 182 and an upper surface 192. The angled main surface 182 is bounded on opposite lateral sides by lower gutter sides 180, 181. The upper surface 192 is bounded on opposite lateral sides by upper gutter sides 190, 191. The main surface 182 is continuous with the upper surface 192 at a bend seam 193. Similarly the lower gutter sides 180, 181 are continuous with the upper gutter sides 190, 191 respectively at the side bends 194, 195. In some embodiments, the upper surface 192 and the main surface 182 along with the respective sides are not bent from the same unitary piece of material, but instead or in addition, are mitered and welded. In some embodiments, the gutter sides 180, 181, 190, 191 extend outward one inch from the gutter surface 183.

[0067] The main surface 182 has an open bottom 184 adjacent the sides 180, 181. The main surface 182 joints at the bottom with a rearward extending bottom foot 199. The rear of the bottom foot 199 has upwardly extending tabs 197, 198 adjacent the sides 180, 181, as is shown in FIGS. 9 and 11. The tabs are spaced apart and the bottom surface 182 at a distance determined by the width of the bottom foot 199. The tabs are configured to hook under the upper receiver lip 149 and into the lip gap 150 of panel vertically below the gutter. The bottom foot 199 may comprise openings 185. These opening can be used during installation or removal to assist the installer in positioning or removing the gutter.

[0068] The gutter 160 an upper shelf 188 adjacent an upper end 189 of the upper surface 192. The upper shelf 188 extends the width of the upper surface 192 and joins the upper sides 190, 191 at opposite ends of the shelf 188 respectively. The upper shelf leaves an upper back wall portion 186 of the upper surface exposed above the upper shelf. A mounting opening 196 is provided in the upper back wall portion 186. In one embodiment, the upper shelf 188 extends forward beyond the front edge 190a of the side walls 190, 191, as is shown in FIG. 10.

[0069] As is shown in FIG. 3, at a joinder area 201, the upper shelf 188 and the portion of the gutter above the upper shelf are configured to be received in the gutter gap 141 of the panel 110 between upper edge 130a of the side 130 and the lower step portion 142. The same is provided on side 134. The height, width, and depth of the gutters and the panels can vary according to job requirements and esthetic desires.

[0070] FIGS. 14, 15A, and 15B shows the panel system installed on a wall 50. The panel system shown has two vertically arranged panels 110, 111. In some embodiments, the top panel 110 may not include the receiver lip 149 as there are no panels or gutters above the top panels to be received into the receiver lip. The panels are positioned between a window trim 56 and a bottom wall flashing 54. A rubber, silicon, or other suitable seal 206 is provided on second step 148 of panel 110. The panel 110 is attached to the wall at the top by a fastener 104, such as a screw. The lower hook 154 of the panel 110 and the tabs 197, 198 of the gutter 160 are both overlappingly received in the lip gap 150 of lower panel 111. Lower panel 111 is secured thought the second recess surface 146 and back plate portion 144 to the wall 50 by fastener 102. The lower hook 154 of the panel 111 and the tabs 197, 198 of gutter 161 are received into a lip gap of a lower wall flashing 206. The lower wall flashing substantially mirrors the wall mounting flange 140 of the panel, but provides a protruding lip 209 that is extends further than the panel. The lower wall flashing 208 is attached to the wall 50 with fastener 103. A vapor barrier 52, such as non woven product comprising spunbond polyethylene, such as olefin, fibers sold under the commercial product name of Tyvek® by DuPont, asphalt paper, rubberized asphalt, or spray on waterproofing, is provided between the wall and the panel system.
FIG. 15A is an enlarged side section view taken along line 15A-15A of FIG. 17. The tab 198 of the gutter is received in the lip gap 150 of panel 111 adjacent or in contact with the upper receiver lip 149. The lower hook 154 of the panel 110 is received in the lip gap behind the tab 198 and in front of the upper portion 137. The lower hook 154 may be adjacent to or in contact with each of the tab 198 of the gutter 160 and the upper portion 137 of the panel 111. The panel is flexible so that lower hook 154 can be bent down and away in the direction B of FIG. 15A to remove the lower hook from the lip gap 150. This allows the upper panel to be removed without removing the lower panel 111 or the gutter 160.

FIG. 15B is an enlarged side section view taken along line 15B-15B of FIG. 17. FIG. 15B shows a section taken through the one of the recesses 156 and protrusions 155 of the panel 110. Tab 197 of the laterally adjacent gutter (not shown in FIG. 17), such as gutter 163 in the arrangement of FIG. 1, is visible behind the protrusion 155. The protrusion 155 ensures a tight fit between the lower hook 154 in the lip gap 150 where the tabs of the gutter are not located. In some embodiments, the distance between the bottom wall 152 and the first step 138 is between 0.50 inches and 12 inches. In some embodiments, the distance between the bottom wall 152 and the first step 138 is greater than 12 inches. The side bends 194 of the gutter are generally horizontally aligned with the first step 138. If the height of the recessed face 136 is reduced, the height of the gutter from the side bends to the top is reduced a corresponding distance. A change in the height of the gutter above the side bends 194, 195 and the recessed face 136 changes the distance between the bottom wall 152 of the upper panel 110 and the first step of the lower panel 111. This changes the overall appearance of the panel system by providing for changing the height of the recess 153 between the bottom wall 152 of the upper panel 110 and the first step 138 of the lower panel 111.

FIGS. 16 shows section top view taken along line 16-16 of FIG. 14. FIG. 16 shows that the sides 134, 130 of horizontally adjacent panels 110, 113 are positioned closer to one another than are the horizontally adjacent panels 110, 113 as shown in FIG. 17. FIG. 16 shows the horizontal positioning of adjacent panels of the configuration shown in FIG. 2. FIG. 17 shows the horizontal positioning of adjacent panels of the configuration shown in FIG. 1.

In some embodiments, there is no space between sides 134, 130 of horizontally adjacent panels 110, 113, such that side 130 contacts side 134. In some embodiments, the distance between adjacent sides 130, 134 is the width of a panel 110 then the gutter 160 is the width of a panel. The distance between the side 130, 134 can be as wide at the distance between upper gutter sides 190, 191, so that the inside surface of panel side 130 is in contact with the inside surface of upper gutter side 191 and the inside surface of panel side 134 is in contact with the inside surface of upper gutter side 190. When the viable width of the gutter surface 183 is of sufficient width, the panel system will have an in-and-out appearance provided by alternating “out” portions comprising the panels and “in” portions comprising the gutters. Therefore, the side 130 may be in contact with side 134 or may be in contact with gutter side 191 or may be located at any position between side 134 and gutter side 191. The sides 130, 134 may overlap the upper gutter side walls 191, 190, respectively a panel overlap distance 176. If the sides 130, 134 are not in contact with each other, there is a panel gap 187 between adjacent sides 130, 134. It will be appreciated that the panel system may be scaled up or down to have any number of panels and corresponding gutters extending horizontally and vertically.

In some embodiments, the panel system comprises a cover system 205 shown in FIG. 18. The cover system include a top panel 210. The top panel has a bottom portion (not shown) that is the same as a bottom portion of the panel 110 comprising the bottom wall 152, the lower hook 154, the protrusion 155, the recess 156, the weep holes 158, and the mounting openings 159. A top portion of the panel 210 is shown in FIG. 18. A front wall 211 of the panel 210 extends up to a top surface 212. The top surface 212 extends rearward to a mounting lip 214. The mounting lip has one or more mounting openings 216 through which a fastener 105 secures the top panel to the wall 50. A top cap 220 covers an opening 108 between the top panel and a top 51 of the wall 50. A front surface 224 of the top cap 220 overlays a portion of the front wall 211 of the top panel. The front surface 224 meets a top surface 222 of the top cap 220 at a right angle. The front surface 224 comprises a protruding lip 226. The top surface 222 has a mounting opening 228 that receives a fastener 106 to secure the top cap to the top 51 of the wall 50.

A cover 230 is provided over the top cap. The cover has a front surface 234, an engaging hook 236, a top surface 231, and a back surface 243. An engaging hook 236 receives the protruding lip 226 of the top cap. The engaging hook 236 is located at a lower end of the front surface 234. The front surface 234 may meet the top surface 231 at an angle other than a right angle creating an open space 246. The back surface 243 is engageable with a back wall 54 by a fastener 107 extending through a mounting aperture 244 in the back surface. The back surface comprises a lower lip 242.

When deployed the panel system is a dry joint system and does not require the application of sealant between the panels and adjacent gutters or between panels and adjacent panels. Referring to FIGS. 2 and 16, when water hits the main surface of the panel 110 it will fall downward. When water hits an exposed gutter surface 183 of the gutter 160, the water will be angled forward by the angled main surface 182. In the case of the arrangement shown in FIG. 1, the water will cascade from gutter 163 to gutter 164 to gutter 162 Likewise water hitting gutter 160 will cascade to gutter 161 and gutter 165. Water traveling in gutter 160 will be confined by the side wall of the panel 110 and 113 respectively that are in the gutter. Most water will be retained on the exposed gutter surface 183 in the panel gap 187. If water gets behind the side walls 130, 134 of either respective panel and within the panel overlap distance 176, the water will be prevented from traveling further laterally by the gutter walls 180, 180, 181, 191. Water on the gutter within the panel overlap distance will be directed out from behind the panels by the angled main surface 182 directing water to the weep holes 158 of the panel. The water will pass out the weep hole in the direct A shown in FIG. 14. The water exiting the weep holes will fall onto the first step 138 of the lower panel 111. Wind or weather will then blow or evaporate the water from the first step 138 off the panel, down the front face of the panel and off the side of the panel into the gutter. The water may cascade from panel to panel or panel to gutter or gutter to gutter, in any combination to reach the bottom of the panel system or building.

In the case of the offset arrangement of FIG. 4, no special components are necessary to achieve the offset arrangement. Panels and gutter are placed in the offset
arrangement and inter-connected as shown in FIG. 15. Water within on the exposed gutter surface 183 in the panel gap 187 will be directed on to the first step 138 of the panel below the gutter. Wind or weather will then blow or evaporate the water from the first step 138 off the panel, down the front face of the panel and/or off the side of the panel into the gutter. The water may cascade from panel to panel or to gutter or gutter to gutter, in any combination to reach the bottom of the panel system or building.

[0079] FIGS. 19-24 show a second embodiment of the panel system with a second embodiment panel 250 and a second embodiment gutter 260. FIGS. 19, 22 and 23 show the second embodiment gutter 260. FIG. 19-20, 24, show the second embodiment panel 250. The second embodiment panel 250 is identical to panel 110, except as shown figures and described below.

[0080] The second embodiment panel has a front main face 272 that connects to a bottom wall 252. The bottom wall 252 is shorter in the rearward direction than the bottom wall 152 of the first embodiment panel 110. The bottom wall 252 has at least two weep holes 258, located in the same lateral locations along the length of the panel as those weep holes 158 of panel 110 shown in FIG. 8. The weep holes may also allow for pressure equalization between air on the outside of the panel system an air behind the panel system as was described above for panel 110.

[0081] The bottom wall 252 meets a vertical first rear wall 253, which meets a horizontal first step wall 257, which meets a vertical hook wall 254. The first rear wall 253 has a vent opening 259 to allow for pressure equalization between air on the outside of the panel system an air behind the panel system. In some embodiments, the vent openings 259 are located adjacent each side wall of the panel on the first rear wall 253. It will be recognized that any number of vent opening 259 or any variation in size can be provided along the first rear wall 253 to achieve the desired rate or speed of pressure equalization. In some embodiments, vent openings are located at every 6 to 12 inches along the first rear wall 253 of the panel. In some embodiments, the vent holes are slots. In some embodiments, pressure equalization occurs via both the weep holes 258 and the vent openings 259. In some embodiments, the arrangement, number, and size of both vent openings 259 and weep holes 258 are provided to achieve the desired rate or speed of pressure equalization.

[0082] The hook wall 254 has a panel emboss or recess 256 on a rear face of the hook wall and a panel protrusion 255 on a front face of the hook wall opposite the recess 256.

[0083] The wall mounting flange 213 of the panel is identical to gutter 160, except as shown and described. The gutter 260 has a gutter surface 283. The gutter surface comprises an angled main surface 282 and an upper surface 292. The angled main surface 282 is bounded on opposite lateral sides by lower gutter sides 280, 281. The upper surface 292 is also bounded on opposite lateral sides by upper gutter sides 190, 191. The main surface 282 is continuous with the upper surface 292 at the bend seam 293. The lower gutter sides 280, 281 are continuous with the upper gutters sides 290, 291 respectively at side bends 294, 295.

[0085] The main surface has an open bottom adjacent the sides 280, 281. The main surface 282 joins at the bottom with a rearward extending bottom foot 299. The rear of the bottom foot 299 has upwardly extending hook tabs 297, 298 adjacent the sides 280, 281. The tabs are spaced apart from the back side of the main surface 282 a distance determined by the width of the bottom foot 299. The tabs are configured to hook under the upper receiver lip 149 and into the lip gap 150 of panel 110 or lip gap 270 of panel 250, 251 or panels 410, 460 that are positioned vertically below the gutter 260, such as shown in FIG. 25 where panel 251 is positioned below gutter 260 although some overlap between the lower most portion of the gutter and the upper most portion of the panel 251. The bottom foot 299 may comprise openings 285.

[0086] The gutter 260 has rear blocking walls 310, 320. The blocking walls 310, 320 are spaced inward from the lower gutter sides 280, 281, respectively toward a vertical centerline of the gutter defined along the mid-point between the lower gutter sides 280, 281. The walls 310, 320 are mirror image identical about the vertical centerline of the gutter. The wall 310 has a blocking plate 312 that is perpendicularly attached to the back side of the main surface 282.

[0087] The blocking plate 312 has a foot plate 316 that is connected or formed perpendicularly to the blocking plate 312 at an end opposite the main surface 282. The blocking plate 312 has a generally triangular shape between the main surface 282 and the foot plate 316. The blocking plate 312 extends below the foot plate 316 along an overhang section 314 adjacent a bottom edge 319 of the blocking plate.

[0088] The upper panel 250 and gutter 260 shown in FIGS. 24 and 25 connected to a lip gap 270 of a lower panel 251 as similar manner as shown in FIG. 15. Panel 251 is identical to panel 250 and gutter 261 is identical to gutter 260. FIG. 25 is an enlarged side view section taken along a line similar to that of 1513-151B of FIG. 17. FIG. 25 shows a section taken through the one of the recesses 256 and protrusions 255 of the panel 110. Tab 297 of the laterally adjacent gutter is visible behind the protrusion 255. The protrusion 255 ensures a tight fit between the of the vertical hook wall 254 in the lip gap 150 areas where the tabs of the gutter are not located. As the first rear wall 253 of the panel 250 is positioned forward as compared to the lower hook 154 of panel 110 so as to provide an air relief area 302 between the first rear wall 253 of the upper panel 250 and a first recessed face 276 of the lower panel 251. The location of the vent opening 259 on the first rear wall 253 of the panel, provides the vent on a surface opposite the main face 272 of the panel. Therefore water cannot be driven directly into the vent opening by wind.

[0089] As is shown in FIG. 24, the blocking walls 310, 320 of the gutter block or disturb air from circulating behind the gutters and the panels. Commercial building, the outside of which the panel system 100 can be deployed thereon, often employ a HVAC system that created a negative air pressure within the building. The negative air pressure can cause air to be drawn in to the building through seams, crevasses, or cracks in the exterior of the building. Therefore it is beneficial to prevent or disturb any air flow that could be created between the outside surface of the panel system and the exterior wall of the building by the negative air pressure. Further, it is beneficial to stop any moisture that might be entrained air behind the panel system from circulating. Therefore reducing the possibility that moisture enters the building through seams, crevasses, or cracks in the exterior of the building. Further, the blocking walls 310, 320 can prevent air from circulating behind the panel system around building corners.

[0090] The bottom edge 319 of the blocking plate 312 is positioned above the second step 248 of the wall mounting flange 213 of the panel 251 creating a break gap 318. The
break gap is provided for easing installation of the panel system. In some applications, it is not required that the blocking wall 310 provide complete blockage of any lateral movement of air. Therefore the minimal break gap 318 does not sufficiently impact that blocking effect of the blocking wall to disturb air from circulating behind the gutters and the panels. [0091] In some embodiments, a seal (not shown) can be placed between the bottom edge 319 of the blocking plate 312 and the second step 248 so as to create a complete blockage. In some embodiments, the blocking plate 312 extends so that the bottom edge 319 contacts the second step 248 to create a complete blockage.

[0092] Regardless whether complete blockage or a break gap 318 is provided, the blocking walls create panel air cells between the blocking walls of laterally adjacent gutters behind the panels. The blocking walls also create gutter air cells between the blocking walls 310, 320 of the gutter.

[0093] FIG. 26 shows third alternative embodiment panels 410, 411. Top panel 410 is identical to panel 250 except that the front surface 432 is angled away from the wall when moving along the front surface in a downward direction C. A bottom wall 452 of panel 410 is longer than the bottom wall 252 of panel 250, so that the front surface 432 of panel 410 is angled between its connection with a top surface 438 and the bottom wall 452. Bottom panel 411 is identical to panel 250 except that the front surface 432a is angled away from the wall 50 when moving along the front surface in an upward direction opposite direction C. The top surface 438a of panel 411 is longer than the top wall 238 of panel 250, so that the front surface of panel 411 is angled between its connection with a bottom wall 452a and the top surface 438a. In some embodiments, the angling of the panels may be reversed such that the front surface at the top surface 438 is horizontally farthest from the wall 50, the bottom wall 452a is horizontally farthest from the wall 50, and the front surface at the bottom wall 452 of panel 410 is horizontally closer to the wall 50 than front surface at the top surface 428, and the front surface at the top surface 438a of panel 411 is closer to the wall 50 than the bottom wall 452a.

[0094] FIG. 27 shows a third embodiment gutter 360. The third embodiment gutter 360 is identical to the second embodiment 260, except then the third embodiment gutter 360 comprises a different top wall 388 and a different foot plate 390. The top wall 388 at the upper edge of the upper surface 292. The top wall connects with the upper gutter sides 390, 391. The top wall has a downward extending lip 389 that is spaced apart from the front edges of the upper gutter sides 390, 391 by a gap distance 387. The upper shelf 388 and the portions of the gutter above the upper shelf 388 are configured to be received in the gutter gap 241 of the panel 250 or the gutter gap 141 of panel 110 or similar gutter gaps of other embodiments of the panel.

[0095] The top wall 388 allows the gutters to be pre-assembled as joined with at least one panel by securing a fastener through the second step 148 and the lower step 142 and through the top wall 388 in an area of overlap between the gutter and the panel, such as overlap distance 176, to connect the gutter to the panel independent from a connection with any exterior wall.

[0096] A main surface 382 of the gutter 360 joints at a bottom edge 396 with a rearward extending bottom foot 399. The rear of the bottom foot 399 has an upwardly extending foot plate 398. The plate 398 is configured to hook under the upper receiver lip 149 and into the lip gap 150 of panel 110 or lip gap 270 of panel 250 or lip gap 270 of panel 250, 251 or panels 410, 460 that are positioned vertically below the gutter 360. The bottom foot 399 may comprise openings 385. When panels, such as panels 110, 250, 410, are used with gutter 360 having the foot plate that extends across the horizontal width of the gutter, the panels may not have protrusions 155, 255, or the protrusion size may be reduced to accommodate the gutter foot plate in the lip gap.

[0098] FIG. 28 shows a fourth embodiment panel 460. Panel 460 is identical to panel 250 except that the wall mounting flange 464 of the panel 460 is different from the wall mounting flange 213 of panel 250. The mounting flange 464 has a top part arrangement comprising a base section and a lip section. The base section comprises lower step portion 482 that connects the first recessed surface 466 to the back plate portion 484. The lip section comprises a T-shaped lip having a mount leg 474 and a lip leg 472. The mount leg 474 lays on top of the lower step portion 482. The lower step portion 482 has a lip section connecting aperture and a lip leg 472. A fastener, such as a sealing lip connection the lip section to the base section. The rivet comprises a top head 486, a shaft 488 and a sealing member 489. The head rests on the surface of the mount leg 474 about the mount aperture. The shaft extends through the mount aperture of the mount leg and the lip section connecting aperture of the lower step portion 482. The shaft is connected to the sealing member that securely contacts the lower surface of the lower step portion 482 to create a water-tight seal.

[0099] FIG. 29 shows a portion of a fifth embodiment panel 550 of the panel system. Panel 550 is identical in shape to panel 250 except for the lower portion shown in FIG. 29. The panel 550 shows an aluminum composite panel where front wall 572 and bottom wall 573 have a middle core 506 between and outer surface 504 and an inside surface 506. In some embodiments, the outside surface and the inside surface are each aluminum and the middle core comprises plastic or foam to form the composite walls 572, 573.

[0100] A hook plate support bracket 520 is attached to an inside surface of the front wall 572 and the bottom wall 573. A fastener, such as a rivet 508 secure the hook plate support bracket 520 in place on the bottom wall 573. The support bracket 520 comprises a front wall 530, a lower wall 532, a vertical first step wall 523, a horizontal first step wall 527, and a vertical hook wall 524. The front wall 530 abuts the inside surface of the front wall 572. The lower wall 532 is supported on the inside surface of the bottom wall 573 and secured thereto by the rivet 508. The lower wall 532 meets the vertical first rear wall 523, which meets a horizontal first step wall 527, which meets a vertical hook wall 524.

[0101] The bottom wall 573 and the lower wall 532 each have at least one weep hole 528, 538. The weep hole 528 of the bottom wall 573 is aligned with the weep hole 538 of the lower wall 532 so that water may exit through the weep holes. The weep holes may also allow for pressure equalization between air on the outside of the panel system and air behind the panel system as was described above for panel 110.

[0102] The first rear wall 523 has a vent opening 529 to allow for pressure equalization between air on the outside of the panel system and air behind the panel system. In some embodiments, the vent openings 529 are located adjacent each side wall of the panel on the first rear wall 523. It will be recognized that any number of vent opening 529 or any variation in size can be provided along the first rear wall 523 to
achieve the desired rate or speed of pressure equalization. In some embodiments, vent openings are located at every 6 to 12 inches along the first rear wall 523 of the panel. In some embodiments, the vent holes are slots. In some embodiments, pressure equalization occurs via both the weep holes 528 and the vent openings 529. In some embodiments, the arrangement, number, and size of both vent openings 529 and weep holes 528 are provided so as to achieve the desired rate or speed of pressure equalization.

[0103] The hook wall 524 has a panel emboss or recess 526 on a rear face of the hook wall and a panel protrusion 525 on a front face of the hook wall opposite the recess 526. FIGS. 30-32 show a sixth embodiment panel of the panel system. Panel 650 is identical in shape to panel 250 except for the lower portion shown in FIGS. 30-32. A vertical hook wall 654 of the panel 650 has rounded extensions 680 extending above a top surface 682 of the vertical hook wall 654.

[0104] The bottom wall 652 has at least two weep holes 658, located in the same lateral locations along the width of the panel as those weep holes 158 of panel 110 shown in FIG. 8. The weep holes may also allow for pressure equalization between air on the outside of the panel system an air behind the panel system as was described above for panel 110.

[0105] The bottom wall 652 meets a vertical first rear wall 653, which meets a horizontal first step wall 657, which meets a vertical hook wall 654. The first rear wall 653 has a vent opening 659 to allow for pressure equalization between air on the outside of the panel system an air behind the panel system. The hook wall 654 has a panel emboss or recesses 656 on a rear face of the hook wall and a panel protrusion 655 on a front face of the hook wall opposite the recess 656. The rounded extensions 680 are concentric with the recesses 656. In some embodiments, the rounded extensions are not rounded but rather are square, triangular, or any other protruding shape.

[0106] The rounded extensions increase the ease by which a panel can be removed from the panel gap of an vertically adjacent panel. In practice, a person may start removing a portion of the vertical hook wall from the panel gap, such as by staring at one end of the panel. The person will then work toward the opposite end of the panel removing the vertical hook wall from the panel gap progressively from one end to the other. The rounded extensions prevent the vertical hook wall from springing back into the panel gap as a person works to remove other portions of the vertical hook wall from the panel gap. The rounded extensions can be placed to rest against the foot bottom 299 of the gutter or can be placed in front of an upper receiver lip 279, 149 of the panel 250, 110, thereby preventing the vertical hook wall from falling back in the panel gap. Any of the other panels 110, 210, 410, 460, 550 may include the rounded extensions.

[0107] The panels 110, 210, 410, 460, 550, 650 and gutters 160, 260, 360 disclosed herein are usable interchangeably within the panel system in any combination. Any of panels 110, 210, 410, 460, 550, 650 can be deployed in any of the embodiments or arrangements disclosed herein, including as a substitute for panel shown or described in a particular arrangement or embodiment. Any of gutters 160, 260, 360 can be deployed in any of the embodiments or arrangements disclosed herein, including as a substitute for the gutter shown or described in a particular arrangement or embodiment.

[0108] From the foregoing, it will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the invention. It is to be understood that no limitation with respect to the specific apparatus illustrated herein is intended or should be inferred.

1. An exterior panel system, comprising:
   a. a panel having a panel main surface and at least one panel side wall;
   b. a gutter having a water channel the water channel comprising a gutter rear wall and at least one gutter side wall, the at least one gutter side wall extending from the gutter rear wall;
   c. a lower receiver configured to join the panel and the gutter to an exterior wall;
   d. the panel located adjacent the gutter and the at least one panel side wall is received into the water channel and extends toward the gutter rear wall, the at least one panel side wall is adjacent to the at least one gutter side wall;
   e. the gutter rear wall at least partially comprises an angled surface, the angled surface extends forward relative to the panel.

2. The exterior panel system of claim 1, wherein the panel has a lower panel lip, and wherein the gutter has a gutter lower lip, wherein the lower gutter lip and the bottom panel lip each configured to be received in the lower receiver.

3. The exterior panel system of claim 2, wherein the panel is a first panel and wherein the system comprises a second panel having a panel main surface and at least one panel side wall, the second panel located below the first panel;
   a. each of the first and second panels having an upper recessed surface and a top lip receiver; the upper recessed surface extending above the main surface and recessed from the main surface; the top lip receiver located adjacent the recessed surface to create a receiving gap there between; and,
   b. the lower receiver is the top lip receiver of the second panel.

4. The exterior panel system of claim 1, wherein the at least one panel side wall comprises at least two panel side walls on opposite sides of the main surface; and
   a. wherein the at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter surface; at least one of the two panel side walls located between the gutter side walls and at least one of the two gutter side walls located between the panel side walls.

5. (canceled)

6. (canceled)

7. The exterior panel system of claim 4, where an overlap space exists along the gutter surface between at least one of the panel side walls and the at least one gutter side wall.

8. (canceled)

9. (canceled)

10. The exterior panel system of claim 1, wherein the panel comprises a bottom wall, the bottom wall comprises at least one weep opening; and wherein the angled surface is angled forward to direct water to the at least one weep opening.

11. (canceled)

12. The exterior panel system of claim 1, wherein the gutter comprises at least one blocking wall extending from a rear surface of the gutter and configured to disturb or stop the circulation of air behind the exterior panel system.

13. The exterior panel system of claim 1, wherein the panel comprises a bottom wall and a vent wall extending from the bottom wall, the vent wall comprises a pressure equalizing vent opening.

14. The exterior panel system of claim 1, wherein the panel is a first panel and wherein the system comprising a second panel having a panel main surface and at least one panel side
wall; the second panel adjacent the first panel; the gutter positioned between the first and second panels;
the at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter surface;
the at least one panel side wall of each of the first and second panels is located between the at least two gutter side walls.

15. A dry joint for an exterior panel system, comprising:
a panel having a panel main surface, at least one panel side wall;
a gutter having a water path, the water path comprising a gutter rear wall and at least one gutter side wall;
a receiver configured to join the panel and the gutter to an exterior wall;
the panel located adjacent the gutter and the at least one panel side wall extends into the water path and toward the gutter rear wall, the at least one panel side wall overlaps the at least one gutter side wall;
the gutter rear wall of the water path at least partially comprises an angled surface to direct water forward relative to the panel, the angled surface ends adjacent a bottom of the panel;
the at least one panel side wall has an angled rear edge, the angled rear edge is angled to accommodate the angled surface of the rear wall.

16. The dry joint of claim 15, wherein the at least one panel side wall contacts the at least one gutter side wall at the point of overlap.

17. The dry joint of claim 15, wherein the at least one panel side wall is spaced apart from the at least one gutter side wall to create an overlap area between at least one panel side wall and the at least one gutter side wall along the gutter rear wall and along the panel main surface.

18. The dry joint of claim 15, wherein the panel has a lower panel lip, and wherein the gutter has a gutter lower lip, wherein the lower gutter lip and the bottom panel lip each are configured to be received in the receiver.

19. The dry joint of claim 15, wherein the panel is a first panel and wherein the system comprises a second panel having a panel main surface and at least one panel side wall;
each of the first and second panels having an upper recessed surface and a top lip receiver; the upper recessed surface extending above the main surface and recessed from the main surface; the top lip receiver located adjacent the recessed surface to create a receiving gap there between; and,
the receiver is the top lip receiver of the second panel.

20. A method of expelling water from behind a panel of an exterior panel system, comprising the steps of:
providing a gutter located behind a portion of a first panel of an exterior panel system, the gutter comprising a water channel, the water channel comprising a gutter rear wall and at least one gutter side wall, the gutter rear wall at least partially comprises an angled surface, the angled surface extends forward relative to the panel, the panel comprising a panel front surface and a panel side wall, the panel side wall received into the water channel; directing water caught in the gutter behind the first panel along the angled surface and through a panel weep hole in a bottom surface of the first panel on to an exterior surface of a second panel of the exterior panel system located below the gutter.

21. The exterior panel system of claim 1, wherein the panel is a first panel and wherein the system comprises a second panel having a panel main surface and at least one panel side wall, the second panel located below the first panel;
at least the second panel comprises a top receiver, the lower receiver is the top receiver of the second panel;
wherein the system comprising a third panel having a panel main surface and at least one panel side wall, the third panel located horizontally adjacent to the first panel;
the gutter configured to be positioned between the first and third panels;
the at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter rear wall;
the at least one panel side wall of each of the first and third panels is located between the at least two gutter side walls.

22. The exterior panel system of claim 1, wherein the panel is a first panel and wherein the system comprises a second panel having a panel main surface and at least one panel side wall, the second panel is located below the first panel, the second panel is horizontally offset from the first panel; the first panel releasably joined to the second panel;
wherein the system comprises a third panel having a panel main surface and at least one panel side wall, the third panel horizontally adjacent to the first panel; the gutter configured to be positioned between the first and third panels;
the at least one gutter side wall comprises at least two gutter side walls on opposite sides of the gutter rear wall;
the at least one panel side wall of each of the first and third panels is located between the at least two gutter side walls;
the water channel of the gutter having an exit that is positioned to direct water onto an exterior surface of the second panel.

23. The exterior panel system of claim 1, wherein the panel has a lower panel lip, and wherein the gutter has a gutter lower lip, wherein the lower gutter lip and the bottom panel lip each are configured to be removable received in the lower receiver; the panel has a flexed position and a standard position; the panel is biased to the standard position; when the panel is flexed the position it can be withdrawn from the lower receiver, when the panel is in the standard position the bottom panel lip is configured to be retained in the lower receiver.

24. The exterior panel system of claim 1, wherein the panel is a first panel and wherein the system comprises a second panel having a panel main surface and at least one panel side wall; each of the first and second panels are configured to be fastened to an exterior wall by one or more fasteners along only a top portion of each panel; the first panel is configured connected to the exterior wall by a releasable connection to the second panel at a bottom portion of the first panel, the releasable connection comprising the lower receiver.

25. The exterior panel system of claim 24, the first panel comprises a lower hook; the second panel comprises an upper hook receiver, the upper hook receiver of the second panel is said lower receiver; and wherein the releasable connection comprises the lower hook of the first panel and the upper hook receiver of the second panel.

26. The exterior panel system of claim 15, wherein the panel main surface and the panel side wall form a panel L-shape, and the gutter rear wall and the at least one gutter side wall from a gutter L-shape, the panel L-shape overlaps with the gutter L-shape so that the panel side wall is received...
into the water channel, the at least one gutter side wall is located behind the panel main surface, and the panel main wall and gutter rear wall at least partially overlap.