

**A METHOD OF INSTALLING A PLUMBING FLANGE, AND A
TRANSPORTABLE BASE**

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FIELD OF THE INVENTION

10 This invention relates to a transportable base and a
method of installing a plumbing flange in a transportable
base.

BACKGROUND

15 The building industry is continuously refining
processes and its use of materials towards more efficient
building processes at a lower cost base. Prefabrication is
a means of reducing on-site assembly time by assembling
components off-site. Generally, the more construction work
that can be done off-site the more efficient the building
20 process will be, as time and cost inefficiencies
associated with, for example, downtime due to weather and
access difficulties, are avoided in a warehouse off-site.

25 More recently prefabrication of entire modular rooms
and dwellings has gained popularity. The prefabrication of
finished rooms or components thereof has its own problems.
Finished surfaces, particularly those with protruding
parts, can become damaged during transportation. Such
damage can be costly and time-consuming as it requires
30 tradespeople to redo work that was previously carried out
and completed during the prefabrication stage.

SUMMARY OF THE INVENTION

35 The invention provides a method for installing a
plumbing flange in a transportable base, the transportable
base having a slab supporting a draining surface, the

method comprising: finishing the draining surface on the slab to form a draining floor that extends adjacent to a drain opening in the slab, wherein the drain opening has a seat and leads to a drain hole; inserting the plumbing
5 flange through the drain opening and locating it on the seat; and sealing the plumbing flange to the transportable base.

10 An advantage of the invention is that it allows a finished transportable base to be transported without damaging fittings installed in a factory before installation on site. Indeed, the invention allows an entire module, namely a modular room with a base, to be transported to site without damage to plumbing components
15 including plumbing flanges protruding from the base. This allows the surface of the base that is to provide a drainage area (i.e. the draining surface) to be finished by tiling, pouring, etc., to thereby form the finished draining floor. The advantage is that the finishing
20 process can be done off site in a factory so that a product as complete as possible is transported for installation on site at which point the plumbing flange can be installed with no alteration or modification to the finished surface and the plumbing lines connected.
25 Standard plumbing flanges are designed to have tiles laid on top of their flanged part and therefore must be installed before the finished surface, which can cause problems in damaging and dislodgement during transportation (where the flanges are installed in a
30 transportable structure) as the plumbing flanges will protrude from the structure.

It is understood that the present invention need not only apply to flooring slabs but could also apply to wall
35 slabs where access to plumbing lines through wall slabs is desired and a draining opening is provided having in part a vertical orientation. Accordingly, the term 'draining

floor' is applied broadly to mean a finished surface that could be vertical, or inclined, as well as substantially horizontal.

5 Allowing the plumbing flange to be inserted through the drain opening, after the draining surface has been finished on top of the slab means that the draining surface can be completed before the plumbing flange is installed. This allows a surface to be completed off-site
10 without necessarily installing the plumbing flange off-site. As a result, it is possible to avoid the plumbing flange being broken during transportation.

 The method may include finishing the draining
15 surface adjacent to the drain opening to define a grate opening through which the plumbing flange is inserted and in which a grate is located.

 The grate acts to prevent larger items passing
20 through the grate opening and continuing through to the drain hole, and the remainder of the plumbing system. It will be understood that the term grate includes both standard metal, plastics, ceramic and mesh style grates, and also includes grates that appear as solid tiles with a
25 thin channel that leads to the drain hole.

 In another embodiment the method may include finishing the draining surface adjacent to the drain opening, and providing a cover that is removably inserted
30 into the drain opening so to access the drain hole and through which the plumbing flange is inserted after the transportable base is installed on site.

 The cover acts to prevent larger items from passing
35 from the draining surface into the drain opening and into the remainder of the plumbing system, while providing a gap around the periphery of the cover which acts as a

draining passage. The cover may be partially removable such that access to the drain hole is maintained. The cover may be configured to house a tile or decorative member to visually obscure the drain opening underneath.

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The method may also include applying a waterproof layer on the draining surface before finishing the draining surface. Placing a waterproof layer between the draining surface and draining floor means that the slab is protected from any moisture that penetrates the draining floor, for example by seeping through the grout between the tiles and into the tile bed.

The method may also include applying the waterproof layer into the drain opening and sealing the plumbing flange to the waterproof layer. Sealing the plumbing flange to the waterproof layer provides a continuous flow surface so that any moisture that penetrates the draining surface will be able to drain through the drain hole, even though it has bypassed the grate opening. Using the above example of a tile bed, sealing the plumbing flange to the waterproof layer would avoid the bed becoming waterlogged.

The method may also include finishing the draining surface when the transportable base is at a first location and transporting the transportable base to a second location and sealing the plumbing flange to the draining floor. In addition, the plumbing flange may be inserted through the drain opening and located on the seat when the transportable base is at the second location. By finishing the draining surface at a first location and then sealing the plumbing flange to the transportable base at a second location it is possible to complete the draining surface off-site and install the plumbing flange on site. The ability to do this may help reduce the likelihood of the plumbing flange being damaged during transportation.

The invention also provides a transportable base comprising: a slab having a drain hole, the drain hole leading to a drain opening; and a draining surface on the slab that is finished up to the drain opening to form a
5 draining floor; wherein the drain opening includes a seat for locating a plumbing flange in the drain opening after the draining surface is finished.

The draining surface may be finished up to the edge
10 of the drain opening so that before transportation the draining surface is in its finished condition with draining floor applied so that no further modification to the draining surface or draining floor will be required after installation.

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The seat can be located in the drain opening at a lower point than the draining floor. Locating the seat lower than the draining floor, allows gravity to assist in draining liquid from the draining surface.

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The ability to locate the plumbing flange on the seat of the drain opening after the draining surface has been finished means that the draining surface may be finished at a first location and the plumbing flange
25 installed at a second location. For example the draining surface can be completed off-site and the plumbing flange installed on site. The ability to do this helps reduce the likelihood of the plumbing flange being damaged during transportation of the transportable base.

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The draining surface of the transportable base may also have a grate opening. A grate may be located in the grate opening and on a grate seat in the drain opening. The grate acts to prevent larger items passing through the
35 grate opening and continuing to the drain hole, and the remainder of the plumbing system.

The transportable base may have a cover, typically a closed cover (as opposed to an open grate) to at least partially close the drain opening. The cover in this embodiment comprises: a base that is insertable and
5 supported on the seat of the drain opening and which supports a draining surface; and a spacing member configured to locate the cover in spaced apart relationship with the seat to thereby define a passage between the edge of the drain opening and the cover
10 thereby allowing a fluid to pass from the draining surface into the drain opening.

The transportable base may have a waterproof layer between the draining surface and the draining floor, e.g.
15 tiles. Providing a waterproof layer between the draining surface and draining floor protects the slab from any moisture that penetrates the draining floor.

The transportable base may form the floor of a
20 modular bathroom pod. The transportable base may be made from glass reinforced concrete. The base may be cast. Casting the base allows an angled portion to be created at the time of casting the base.

25 The invention also provides a modular bathroom pod comprising the transportable base described above.

The invention also provides a method of installing a plumbing flange in the transportable base described above,
30 the method comprising: inserting the plumbing flange through the drain opening and locating it on the seat. The method may include sealing the plumbing flange to the transportable base.

35 The invention also provides a method of installing a plumbing flange in the modular bathroom pod described above, the method comprising: inserting the plumbing

flange through the drain opening and locating it on the seat. The method may include sealing the plumbing flange to the transportable base.

5 BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment, incorporating all aspects of the invention, will now be described by way of example only with reference to the accompanying drawings in which:

10 Figure 1 is cross sectional view of a transportable base;

Figure 2 is an isometric view of a slab;

Figure 3A is close up of a drain opening in the slab of Figure 2;

15 Figure 3B is a cross sectional view of the drain opening of Figure 3A;

Figure 4A is an isometric view of a plumbing flange;

Figure 4B is a plan view of the plumbing flange;

Figure 4C is a side view of the plumbing flange;

20 Figure 5A is an isometric view of a modular bathroom pod;

Figure 5B is a second isometric view of the modular bathroom pod of Figure 5A;

25 Figure 5C is a plan view of the modular bathroom pod of Figure 5A and Figure 5B;

Figure 6 is a plan view of an alternative floor plan for modular bathroom pod without the fixtures and fittings;

30 Figure 7 is a cross sectional view at D1 of the modular bathroom pod of Figure 6;

Figure 8 is a cross section of a transportable base with a waterproof membrane;

Figure 9 is a plan view of a cover for obscuring the plumbing flange within the modular bathroom pod;

35 Figure 10 is a sectional view taken along line AA of the cover of Figure 9;

Figure 11 is a perspective view of a base of the

cover of Figure 9, illustrating four outwardly extending feet;

Figure 12 is a perspective view of a frame associated with the cover of Figure 9;

5 Figure 13 is a plan view of the cover, illustrating the location of the four feet and a peripheral drainage channel formed between the cover and the frame;

Figure 14 is a sectional view taken along line BB from Figure 13;

10 Figure 15 is a magnified view of circled area C from Figure 13, illustrating a foot of the cover extending beyond the periphery of the base within the boundary of the frame;

Figure 16 is a plan view of the base and four feet;

15 Figure 17 is a sectional view taken along line CC of Figure 16, illustrating a peripheral wall of the base;

Figure 18 is a plan view of the frame, illustrating four peripheral flanges;

20 Figure 19 is a sectional view taken along line DD of Figure 18, illustrating a side profile of the frame;

Figure 20A is an isometric view of a plumbing flange, according to one embodiment of the invention;

Figure 20B is a plan view of the plumbing flange of Figure 20A;

25 Figure 20C is a side view of the plumbing flange of Figure 20A; and

Figure 21 is a sectional view of the cover of Figure 9 when installed adjacent the plumbing flange of Figure 20A.

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DETAILED DESCRIPTION OF THE INVENTION

35 Figures 1 to 8 illustrate a first embodiment of a transportable base 10 and method of installing a plumbing flange into the transportable base, while Figures 9 to 21 illustrate a second embodiment.

Starting with the first embodiment, Figure 1 illustrates a transportable base 10 in which a plumbing flange 20 has been installed. The transportable base has a slab 30 having a drain hole 32. A drain opening 45 leads to the drain hole 32 and in the first embodiment is shown as open channel 33. The open channel 33 includes a seat 34 for locating a plumbing flange. A draining surface 40 on top of the slab 30 is finished with a draining floor 12, which in the embodiment shown are floor tiles. Draining floor 12 finishes up to and adjacent the open channel 33. The open channel 33 is adapted to allow a plumbing flange 20 to be located on the seat 34 of the open channel 33 after the draining floor 12 has been laid.

It will be understood that the finish on the draining surface will not necessarily be floor tiles. The draining floor could be a polished concrete surface, where the draining surface itself is polished or a flooring material is poured in situ then polished, or any other surface suitable for a wet area that could provide a draining floor. It will be understood that the draining surface could therefore be laid, poured or applied by other known technique.

The transportable base 10 is for a bathroom. However, it is understood that the transportable base 10 may be used for other uses, particularly those having wet areas such as kitchens, laundries, outdoor areas or any other base that is transportable and has a drain opening requiring a plumbing flange installed therein. The embodiment shown in the figures is a transportable base 10 for a modular bathroom pod 1 for installation into a building. The transportable base 10 may be a floor structure that supports the walls of a modular bathroom pod.

Referring to Figures 2, 3A, 3B and 5, the slab 30 is

a substantially rectangular structure. The draining surface 40 of slab 30 has a flat portion 36 and an angled portion 37. The angled portion 37 is sloped towards the open channel 33. The open channel 33 runs substantially the entire length of the slab 30. The slab 30 has a hob 31 that extends peripherally around the periphery of the slab, except at an entrance 38.

The open channel 33 has a recessed grate seat 60, onto which a grate 65 can be seated. The floor tiles, which are laid adjacent to the open channel 33 and up to the channel's walls 33a, 33b, define a grate opening 35. As shown in Figure 8, the open channel's walls 33a, 33b may be defined by tile angles 70. The tile angles 70 are generally straight lengths of angled trim that provide a finished edge. The tile angles 70 are extruded and may be made from aluminium, plastics such as PVC, stainless steel or any other suitable material.

The open channel 33 also has a draining channel 39 that is lower than the underside of the floor tiles 12, and is angled towards the drain hole 32. The drain hole 32 extends through the slab 30. The diameter of the drain hole 32 is less than the distance between the walls 33a, 33b of the open channel 33.

The open channel 33 also has a seat 34 for locating the plumbing flange 20. The seat 34 is at a lower point than the underside of the floor tiles 12. The seat 34 is also at a lower point than the draining channel 39.

It will be understood that while the draining channel 39 is shown as being below the grate seat 60 it may be flush with at least part of the grate seat 60. In addition, it will be understood that the grate seat could be flush with the flat portion 36 and/or the angled portion 37 of the slab 30. It will also be understood that

the draining channel 39 doesn't need to be angled towards the drain hole 32, however it should not be angled away from the draining hole.

5 As the seat 34 is lower than an underside of the floor tiles 12 it is not possible to locate a plumbing flange that is wider than the grate opening 35 and the channel opening 33.

10 It will be understood that the slab 30 does not need to be rectangular. For example, Figure 6 illustrates a non-rectangular slab 130. The slab 130 has a hob 131 that extends peripherally around the periphery of the slab except at an entrance 138. The drain opening, in the form
15 of open channel 133, is located at the periphery of the slab 130 and extends substantially the entire length of portion of the slab 130 that it occupies. The slab 130 has a flat portion 136 and an angled portion 137. The angled portion 137 is sloped towards the open channel 133.

20 The slab 30, 130 is made from light weight fibre reinforced material such as fibre reinforced plastics or fibre reinforced concrete. Preferably, the slab 30, 130 is made out of glass reinforced concrete (GRC). The slab is
25 preferably cast. Casting the slab allows the angled portion 37, 137 to be created when the slab 30, 130 is created.

30 The angled portion 37, 137 may designate a shower in of the bathroom where the angled floor facilitates draining of the shower water into the open channel 33, 133.

35 It will be understood that the drain opening could be located in any suitable position in the slab 30, 130. For example, as shown in Figure 2, the open channel 33 could be in the central area of the slab 30.

Alternatively, as shown in Figure 6, the open channel 133 could be located towards the periphery of the slab 130.

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It will also be understood that the drain opening does not have to run the substantially the length of the slab. It could instead only run for a portion of the length of the slab, with the draining floor angled towards the drain opening to facilitate the flow of liquid toward the drain opening.

Figure 4 illustrates a plumbing flange 20. The plumbing flange 20 has a pipe 22 and a flanged edge 24. The pipe 22 is positioned so that the flanged edge 24 extends radially outwardly from the pipe 22. The flanged edge 24 is perpendicular to a central axis 26 of the pipe 22. The flanged edge 24 is rectangular in shape having a short side 25a and a long side 25b. The short side 25a allows the plumbing flange 20 to be easily inserted into the open channel 33, while the long side 25b provides a larger surface area for sealing the plumbing flange 20 to the floor tiles 12.

At least one of the short sides 25a and the long sides 25b of the plumbing flange 20 is equal to or less than the distance between the walls 33a, 33b of the open channel 33. This allows the plumbing flange 20 to sit in the seat 34 and not extend under the floor tiles 12. Preferably, the width of the short side 25a is slightly less than the distance between the walls 33a, 33b of the open channel 33. For example, the distance between the walls 33a, 33b of the open channel 33 may be 89mm and the width of the short side 25a of the plumbing flange 20 may be 85mm, providing on average 2mm either side of the plumbing flange 20 when the plumbing flange 20 is located in the seat 34.

The width of the short side 25a of the plumbing flange 20 is equal to or less than the width 66 of the grate 65. The width of the short side 25a of the plumbing flange 20 is therefore less than the width of the grate opening 35. The plumbing flange 20 does not extend under the floor tiles 12.

It will be understood that the diameter of the pipe 22 of the plumbing flange 20 can be any suitable size that is less than the short side 25a of the plumbing flange 20. The diameter of the pipe 22 will be determined by the diameter of the pipe that the flange is being connected to.

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It will be understood that the flange doesn't need to be rectangular and could be any other suitable shape, so long as the plumbing flange 20 is able to be inserted through the drain opening. As the seat 34 is designed to house the plumbing flange 20 it is also rectangular. However, the seat 34 could be any shape that allows the plumbing flange 20 to be seated into it.

The plumbing flange 20 can be made of any suitable material. For example the plumbing flange could be made of polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS).

During construction of the transportable base 10 the floor tiles 12 are laid on the draining surface 40 on top of the slab 30 and adjacent to the open channel 33 in the slab 30. The floor tiles define the draining floor 12 of the transportable base 10. Once the floor tiles 12 have been laid the plumbing flange 20 is inserted through the open channel 33 and located on the seat 34. The plumbing flange 20 is then sealed to the floor tiles 12.

The floor tiles 12 are laid adjacent to the open channel 33 and up to the channel's edge to define a grate opening 35 through which the plumbing flange 20 is inserted. A grate, shown as stainless steel shower grate 65, is seated in the grate opening 35 and on grate seat 60. The grate 65 lies substantially flush with the floor tiles 12, and close to a tile angle 70, providing a stepless transition between the floor tiles 12 and the grate 65. In the embodiment shown in Figure 2 the grate 65 will provide a stepless transition between the floor tiles 12 on the flat portion 36 and the floor tiles 12 on the angled portion 37.

A waterproof layer, shown as waterproof membrane 50 (dashed line) in Figure 8, may be located between the draining surface 40 of the slab 30 and the floor tiles 12. The waterproof membrane 50 is applied over the draining surface 40 before laying the floor tiles 12. In this example, once the waterproof membrane 50 has been applied the tile angles 70 are placed in position and the floor tiles 12 are laid. Following this the plumbing flange 20 is inserted through the open channel 33 and located on the seat 34. The plumbing flange 20 is then sealed to the waterproof membrane 50 by continuing the waterproof membrane 50 over the flanged edge 24 and can also enter the draining passage of the plumbing flange.

During the tiling process a screed layer is normally applied before the tiles are laid; the screed layer is applied after the waterproof membrane but before the tiles are laid.

The method for installing the plumbing flange 20 can take place in two different locations. When the transportable base 10 is at a first location, and namely the manufacturing factory, the floor tiles 12 are laid. Thereafter, the transportable base is transported to a

second location, namely the location of installation. While the plumbing flange 20 can be installed in the open channel 33 and located on seat 34, when the transportable base 10 is at the first location, the system of the
5 transportable base and plumbing flange lends itself to finalising the plumbing flange installation after transportation and at the second location. Either way, there is no need to re-do or complete the draining surface around the drain hole, because the plumbing flange 20 does
10 not interfere with the draining surface.

It will be understood that the plumbing flange 20 may be glued into position on the seat 34 or attached to the seat by fasteners or any other suitable method.
15 Alternatively, the plumbing flange may be held in positioned in the seat 34 by the outer membrane coated over the flanged edges.

Sealing the plumbing flange to the transportable
20 base 10 involves applying a second waterproof membrane 55 (dashed line) over the flanged edge 24 and into the pipe 22. The waterproof membrane 55 is also applied to the remainder of the open channel 33 until it contacts either the floor tiles 12 or the waterproof membrane 50 in order
25 to seal the plumbing flange 22 to the floor tiles 12. As discussed earlier, the second membrane 55 may be a later applied continuation of the first membrane 50.

Once the plumbing flange 20 has been sealed to the
30 floor tiles 12, and namely to form a continuous sealed surface with the floor tiles, the grate 65 is placed to cover the grate opening 35. While the grate is shown as stainless steel shower grate 65, it will be understood that the grate could be any suitable covering that
35 substantially covers the open channel 33 but still allows water to drain from the draining floor 12 into the open channel 33.

The second embodiment of the invention is illustrated in Figures 9 to 21. This embodiment allows for a drain arrangement to accommodate drainage outlets and pipes having larger dimensions than those of the first embodiment, and also provides a drainage arrangement having a different aesthetic appeal to the first embodiment.

Figures 9 to 21 illustrate a cover 80 that sits in a drain opening 45 and covers the drain hole 32 but allows a draining gap 120 between the cover 80 and draining floor 12 through which water drains from the draining floor 12 into the drain hole 32. The cover 80 is illustrated in Figure 9, and comprises a base 100 and a support spacer, illustrated as four identical feet 110. Base 100 is configured to receive and support a finish material, and usually the same material used to finish the drainage surface, for example, tiles, stone, in situ poured cement mix, etc. Cover 80 is adapted to sit inside of a trim member, illustrated as a closed frame 90.

The frame 90 is installed on the draining surface 40 of the transportable base 10 before the draining surface 40 is finished and is provided to define a periphery into which the cover 80 is inserted, where the periphery of frame 90 encloses an area that is larger than the area of the cover 80 to ensure draining gap 120 is properly provided. In some circumstances the cover 80 may be inserted into a drain opening without the use of, or need for, frame 90 although it is considered that frame 90 provides an aesthetically better finish as well as a surface against which water can drain.

The frame 90 is substantially square, when viewed in plan, with rounded corner profiles 94. The frame 90 is configured to provide peripheral flanges 92 that extend

outwardly from the frame 90 substantially perpendicular to the sides 96 of the frame 90. In the embodiment shown the frame 90 is symmetrical although it will be sized and shaped to correspond to the size and shape of the base
5 100.

The frame 90 can be manufactured from sheet material for example, steel or stainless steel (see Figure 12). It is further contemplated that the frame could be injection
10 moulded from a plastic material or fabricated from a sheet moulding compound of sheet moulding composite. In use the frame 90 will be constantly exposed to water, so it is preferable to use materials that do not react (or corrode) with water contact.

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The frame 90 is illustrated in detail in Figure 18 and the sectional view of Figure 19. In Figure 19 the profile of side wall 96 is illustrated. When formed of sheet metal, such as stainless steel, the frame 90 can be
20 formed from a punched strip. Along each sidewall 96 there is a pair of U-shaped slots 98 which delineate a central tab therebetween. The tabs are bent or folded by 90 degrees to extend from the sidewalls 96 and thereby create flanges 92 on each side of the frame 90. These flanges 92
25 seat the frame 90 upon the slab 30 of the transportable base 10.

The plumbing flange 20' used in the second embodiment is generally larger in size than the plumbing
30 flange referred to in the first embodiment (both in terms of the diameter of the flange's pipe fitting and its flanged edge). Figure 10 illustrates one variation of a larger plumbing flange 20' while Figures 20A - 20C illustrate another variation.

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The plumbing flange 20' as shown in Figures 20A-20C has an approximately square flanged edge 24'. Accordingly,

a length l of flanged edge 25A' and width w of flanged edge 25B' are substantially the same length. In this embodiment length l and width w are approximately 140mm. The pipe 22' of the plumbing flange 20' is approximately
5 80mm in diameter in this embodiment and can also be manufactured as 100mm in diameter, or anywhere in between to suit standard drainage plumbing sizes. It is understood that alternate standard sizes can be produced for use in different jurisdictions. A thickness t of the
10 flanged edge 24' can range from 1.5mm to 4mm. In a preferred embodiment the flanged edge thickness t is 2.4mm.

The pipe 22' of plumbing flange 20' extends a depth
15 d into the drain hole 32. The depth d of the pipe 22' of the plumbing flange 20' of this embodiment is approximately 46mm but can be manufactured in various depths, to suit a given transportable base 10 or range of bases 10. Furthermore, the depth of pipe 22' of the
20 plumbing flange 20' can be simply reduced by cutting or sawing the pipe 22' to a desired depth.

The frame 90 is fitted on the draining surface 40 at the drain opening 45 of the transportable base 10 before
25 transport so that the frame 90 can be sealed to the transportable base 10 and tiled over (see Figure 21 which shows tiles 12 laid over tabs 92 of frame 90). The base 100 and spacer 110 of the cover 80 sit on top of the drain opening seat 34 and/or on top of the plumbing flange 20',
30 and the cover 80 is removable from the frame 90 and can be removed at any time to gain access to the drain hole 32 (e.g. in order to insert the plumbing flange 20' through the frame 90 to locate the plumbing flange 20' on the seat 34, or to inspect the plumbing flange 20' and connected
35 plumbing system after the plumbing flange 20' has been installed).

The frame 90 is approximately 23mm in height and approximately 196mm in length. Each flange 92 is approximately 13mm in depth and approximately 100mm in length. The material of the frame 90 when manufactured from metal is approximately 1.2mm in thickness. However, the thickness and dimension of the frame 90 will be altered for different materials to ensure the closer 80 has sufficient strength and resilience.

The frame 90 has outer dimensions of 196mm x 196mm and is sufficiently large for the plumbing flange 20' to be installed through the frame 90, whether the plumbing flange 20' is configured to have an 80mm/100mm diameter or some alternate standard dimension.

The base 100 is illustrated in plan view in Figure 9 and in cross section in Figure 10 which is taken along line AA of Figure 9. The base 100 comprises a flat surface or tray 102 having a peripheral wall 104. By its tray 102 and peripheral upstanding wall 104, the base 100 is configured to house a tile 12 or other decorative element to cover the drain hole 32 whilst not obstructing a fluid passage from the tiles/drainage floor 12 into the draining gap 120.

When fabricated from steel the base 100 is approximately 1.2mm in thickness; however, this thickness will be adjusted accordingly to complement the material of the base 100. The base is approximately 13mm in depth and has external dimensions 156mm x 156mm. When positioned centrally within the frame 90 this provides the drainage gap 120 of approximately 5mm around the entire perimeter of the cover 80.

The base is provided with a spacing member, illustrated in Figure 11 as four feet 110. The spacing member spaces the base above the drain hole 32 and

plumbing flange so that water can flow from the drainage floor 12 through gap 120 and under base 100 to access the drain hole through the plumbing flange. The feet 110 are 8.6mm in depth and are manufactured from steel, preferably a stainless steel, grade 304 or 316. The feet 110 are approximately 18mm in width and approximately 60mm in length. Each foot 110 has a rectangular profile and is located to cooperate with the four corner profiles 94 of the frame 90. In one embodiment of the cover 80 illustrated in Figure 11, the distal end 110a of each foot 110 tapers to a central apex 112. The central apex 112 nests within the corner profile 94 of the frame 90 to maintain the cover within the frame 90 in a central location.

In Figure 15 the drainage gap 120 can be seen between the base 100 and the frame 90. In this magnified view, the feet 110 can be seen to extend from the base 100 into the gap 120 by a distance 116. The distance 116 is approximately 4mm. The distance of 4mm is sufficient to provide a stable support to the base 100 upon the frame 90 without the feet 110 scraping against or damaging the frame 90.

In Figure 16 the feet 110 are illustrated to have a rectangular form with no central apex 112. In this manner the two distal corners 118 protrude from the perimeter of the base 100 to align with the corner profiles 94 of the frame 90. Figure 17 illustrates a section, taken along line CC of Figure 16. In figure 17 the minimal overhang 116 of the foot 110 is shown in relation to the side wall 104 of the base 100.

In this embodiment, the feet 110 are attached to the base 100 by spot welds 114 as illustrated in Figure 11. It is contemplated that alternative mechanical connectors can be used, such as nails, bolts, screws, rivets, studs,

adhesives and the like. The choice of fastener will be dependent on the material used to manufacture the feet 110 and cover 80. When the cover 80 is formed from plastic materials or sheet moulding compound, the feet 110 can be
5 formed integrally with the base 100.

As the feet 110 have a thickness of 8.6mm the base 100 is held at each corner above the drainage gap 45. Suspended in this manner, the base 100 does not prevent
10 fluid travelling from the drainage floor 12 into the drain hole 32. The thickness of the feet 110 can be varied in relation to the depth of the cover 100 to facilitate a greater flow volume into the drain hole 32. It is preferable to maintain the base 100 at a depth such that
15 the tile 12 or decorative element within the base 100 is at the same level as the drainage floor 12 to prevent a tripping hazard to a user.

Figure 13 illustrates the four equidistantly spaced
20 feet 110 around the base 100. However, a section taken along line BB is illustrated in Figure 14, and serves to highlight that the feet 110 have minimal effect on the flow of fluid through the drainage gap 120.

25 It is contemplated that a single large tile 12 may be placed in the base 100. However, a plurality of smaller tiles can also be housed in the base 100 or a metal insert as a decorative feature. The base 100 is maintained in place laterally by the cooperation between
30 the feet 110 and the seat 34 and/or the plumbing flange. The base 100 is maintained in place vertically by gravity. The base 100 can be easily removed when access to the drain opening 45 of drain hole 32 is required. The feet 110 are easily mounted to the base 100 and positioned over
35 the drain hole 32, once the plumbing flange 20' has been installed into the modular bathroom pod 1.

Figure 21 illustrates a cross-sectional view of the plumbing flange 20' in position in a drain hole 32 with the cover 80 installed to partially obscure the drain. The drainage gap 120 bounds the cover 80 whilst a decorative tile 12 is placed within the base 100 hides the drain opening 45.

The steps for installing a plumbing flange 20, 20' are:

- 10 • apply a waterproof membrane 50 over the slab 30 and into the drain opening 45, and open channel 33, if provided;
- install the tile angles 70 or frame 90, and lay the flooring (e.g. floor tiles 12) on top of the slab 30 adjacent to the open channel 33/drain opening 45 in the slab 30 and laying flooring up against the tile angles 70 or frame 90;
- 15 • insert the plumbing flange 20, 20' through the drain opening 45, usually after transportation of the base to site;
- 20 • locate and secure the plumbing flange 20, 20' in the seat 34 by gluing the plumbing flange 20, 20' to the slab 30;
- seal the plumbing flange 20, 20' to the waterproof membrane 50 by applying a second membrane 55 over the top of the installed plumbing flange 20, 20' and overlapping/joining the second membrane with the first membrane 50; and
- 25 • cover the drain opening 45 with a grate 65 through which water can drain, or with a closed cover 80 that leaves a draining gap between the cover periphery and the drain opening periphery.
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It is envisaged that a modular bathroom pod 1 will be pre-fabricated in a factory in a substantially complete manner. This will involve the steps of applying a waterproof membrane 50 over the slab 30 and laying the

floor tiles 12 on top of the slab 30 adjacent to the open channel 33 in the slab 30 being carried out at the factory.

5 The remainder of the modular bathroom pod 1 is also substantially constructed at the factory and then transported to the work site where it is installed into the structure of the main building. As shown in Figure 7 the surrounding hob 31 of the slab 30 is positioned
10 outside the internal cladding 82 of the wall structure. A sealing caulk 84 is positioned at the join between the internal cladding 82 and the floor tiles 12 to ensure a totally water tight structure. If the open channel 33 is towards the periphery of the slab 30, such that a draining
15 surface is not present between the open channel 33 and the hob 31, the sealing caulk is positioned at the join between the internal cladding 82 and the slab 30 to ensure an entirely water tight structure.

20 The modular bathroom pod 1 is then transported to the work site. It will be understood that the modular bathroom pod 1 is delivered substantially complete, that is containing the majority of the internal fittings, plumbing and electrical wiring, but not including the
25 plumbing flange installed at the drain holes.

 Once the modular bathroom pod 1 is on site the pod is installed. The pod is placed in position and secured to the floor structure using appropriate fasteners. The
30 plumbing and wiring services are connected and the plumbing flange 20 is installed, waterproofed and connected to drainage pipes under the slab and to the plumbing system of the main building.

35 Installing the plumbing flange on site, rather than at the factory has the advantage in that it avoids the plumbing flange being susceptible to damage during

transportation and handling of the modular bathroom pod.

5 In the claims which follow and in the preceding
description of the invention, except where the context
requires otherwise due to express language or necessary
implication, the word "comprise" or variations such as
"comprises" or "comprising" is used in an inclusive sense,
i.e. to specify the presence of the stated features but
not to preclude the presence or addition of further
10 features in various embodiments of the invention.

CLAIMS:

1. A method for installing a plumbing flange in a transportable modular room, the transportable modular room having a slab supporting a draining surface and a room wall structure upstanding from the slab, the method comprising:
 - 5 finishing the draining surface on the slab to form a finished draining floor that extends adjacent to a drain opening in the slab, wherein the drain opening has a seat and leads to a drain hole;
inserting the plumbing flange through the drain opening and locating it on the seat; and
 - 10 sealing the plumbing flange to the slab.
2. The method of claim 1, including applying a waterproof layer on the draining surface before finishing the draining surface.
- 15 3. The method of claim 2, including applying the waterproof layer into the drain opening, wherein the plumbing flange is sealed to the waterproof layer.
4. The method of any one of the preceding claims, including finishing the draining surface when the transportable modular room is at a first location and transporting the transportable modular room to a second location.
- 20 5. The method of claim 4, including inserting the plumbing flange through the drain opening and locating it on the seat when the transportable modular room is at the second location.
- 25 6. The method of any one of claims 1 to 5, including inserting a removable cover into the drain opening, wherein a gap around a periphery of the cover acts as a draining passage.
- 30 7. The method of any one of the preceding claims, including installing a trim at an edge of the drain opening before finishing the draining surface.
8. The method of 7, including installing tile angles at the edge to form the trim and/or installing a frame around the drain opening to form the trim.
- 35 9. The method of any one of the preceding claims, including finishing the draining surface by laying flooring on the draining surface to form the draining floor.

10. The method of claim 9, wherein laying flooring includes laying tiles or pouring flooring in situ.

5 11. A transportable modular room comprising:

a slab and a room wall structure upstanding from the slab, the slab having a drain hole, the drain hole leading to a drain opening; and

a draining surface on the slab that is finished up to the drain opening to form a finished draining floor;

10 wherein the drain opening includes a seat for locating a plumbing flange in the drain opening after the draining surface is finished.

12. The transportable modular room of claim 11, wherein the draining surface is finished up to the edge of the drain opening.

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13. The transportable modular room of claim 11 or 12, wherein the seat is located in the drain opening at a lower point than the draining surface.

14. The transportable modular room of any one of claims 11 to 13, wherein the draining surface comprises a trim member mounted at the draining opening.

20

15. The transportable modular room of claim 14, comprising a cover adapted to sit spaced from the trim member, wherein the space between the trim member and the cover forms a gap around a periphery of the cover that acts as a draining passage.

25

16. The transportable modular room of any one of claims 11 to 15, comprising a waterproof layer between the draining surface and the draining floor.

17. The transportable modular room of any one of claims 11 to 16, wherein the modular room is a wet area modular room wherein the finished draining floor extends substantially across the entire modular room.

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18. The transportable base of any one of claims 11 to 17, wherein the transportable modular room is a bathroom pod.

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19. The transportable modular room of any one of claims 11 to 18, wherein the floor slab is made from glass reinforced concrete.