

Floor Drainage Cover with Removable Mechanical Seal Device

TECHNICAL FIELD

5 The invention of floor drainage cover broadly relates to a complete floor drainage cover and a design to reduce transmission of smell and prevent insects from crawling or flying in and out from the floor drainage.

BACKGROUND

10 The current construction of floor drainage cover is typically used to allow fluids to flow through the drainage pipe with minimum barrier or blockage. The removable mechanical sealing device is placed inside the floor drainage cover is optional. This floor drainage cover also serves to prevent any injury like accident caused by human stepping and slipping into the drainage hole. According to the Singapore Code of Practice for Surface Water Drainage Section 9.14.1, the floor drainage cover must be able to take a live load surcharge of greater than 10KN/m². The grating drain plate of the floor drainage cover must not be too big as
15 large particles can easily choke the main drainage line and there must be of sufficient opening for water to drain out without having the consequences of choking or flooding. This grating is usually secured by a hinge to the main floor drainage cover.

One problem that typically arises from the conventional floor drainage cover is that the floor drainage cover hinge creates a gap in the design of the retaining ring flange that is
20 designed to hold the removable mechanical sealing device. This clearance is needed at the bottom of the welded hinge for the grating drain plate to open and close. This open gap will not be able to be sealed even with any typical removable mechanical sealing device that is placed on the retaining ring. Many try to work around and resolve this condition through frequent washing to clear the underfloor drainage pipe fluid, the odour smell and the
25 insects that crawl or fly in and out from this gap. It is noted that the typical building floor drainage will have a U or S-trap underneath each floor to prevent backflow of gases to the room.

The second problem with today's conventional hinge design is that the cover is unable to close completely with a removable mechanical sealing device placed beneath the hinged
30 cover. This potentially results in a safety hazard of tripping and falling. With the incomplete closure of the hinge flap, many times we have unwanted large volume of dirty water flowing down to the drainage pipe through this open hinged cover resulting the underfloor drainage pipe to have more frequent chokes than normal.

There are many other versions of complete floor drainage cover of removable mechanical
35 sealing devices in the market like the inverted cup deodorant using water trap where there is a possibility of stagnant water, the anti-cockroach flap seal and the spring seal with the small opening but the waste fluid flow is restricted. All the above designs have a fixed small opening where the large unplugging devices will not be able to be placed through this opening to clean up the underfloor drainage pipe.

Furthermore, with all these design problems of the conventional floor drainage cover, it poses a health danger of odour accumulation in the room or area if the place is not in use for a long time. The insects that are growing inside the floor drainage cover can crawl in and out and spread diseases and germs all over the place especially in a kitchen.

- 5 In view of the above, there is a need to have a floor drainage cover with a better design which overcomes the shortfall of the conventional floor drainage cover design with a complete retaining ring flange for a good all-round seal with a mechanical seal device and allows easy access and reuse of any of their conventional floor removable mechanical seal devices into this new floor drainage cover to save cost of need to replace the old mechanical
10 seal devices that the user already have.

SUMMARY

- In accordance with the first aspect of the new invention, there is a need to provide a complete drainage cover which consists of a body for the drainage cover to be fixed to the
15 ground and a circular disc with multiple small openings for liquid to flow through. A circular ring flange opening at the end of the floor drainage cover to supports most major types of removable mechanical sealing devices in the market. A removable mechanical sealing device is designed to separate through contact between the drain and the surface environment thus creating a mechanical barrier. This mechanical seal device comes with a flap to allow
20 liquid waste to have a gravitational flow down the drainage pipe. The main drainage cover is capable of sealing the conventional floor drainage opening. This is design of standard sizing to replace the conventional drainage cover. It is made of materials, thick enough to have a load bearing of greater than 10KN/m^2 . This main body consists of two complete circular ring flanges, one on top to support the grating drain plate, another at the end to support the
25 removable mechanical seal device and is wide enough for our hand to access down the underfloor drainage pipe.

- The grating drain plate is designed to make easy removal if required and can be turned and locked to prevent the grating drain plate from dislodging from the floor drainage cover. This grating drain plate has multiple openings on the surface to allow quick flow of liquid through
30 the floor drainage piping while preventing big objects like stones and rugs from flowing through and choking the underfloor drainage pipe.

- With this large opening of the main drainage cover, an additional removable mechanical sealed device made of antibacterial material can be designed with different depth to cater for the waste fluid flow volume need at different installation locations. This flap close up the
35 path when no liquid is flowing through. The mechanical seal device will be made with plastic of antibacterial property by the additional of Titanium Oxide in the master batch.

- With this floor drainage cover, a complete unit will be mounted on the floor with a removable turn and secured grating drain plate on the top of the drainage cover ring flange and this grating drain plate surface will recess in with the drainage cover surface. A
40 removable mechanical seal device is placed on the lower ring flange. This device is one that

creates a barrier or blockage between the drainage pipe fluid and the surrounding atmosphere. This ring flange opening is large enough for a hand or clearing tools to go through in case of choking in the underfloor drainage pipe.

5 Brief Description of the drawing

The description of the drawing below will give a better understanding of my current design.

Figure 1. A prospective view of the complete floor drainage cover with a removable mechanical sealing device

Figure 2. A prospective view of the main floor drainage cover

10 Figure 3. An exploded view of the complete drainage cover unit

Figure 4. A cross-sectional view of floor drainage cover installed on an underfloor UPVC piping. A sketch of the segmented view of the floor drain piping with the drain cover

Figure 5. Plan View

Figure 6. Front View

15 Figure 7. End View

DETAILED DESCRIPTION

Figure 1 is a prospective view of the completed floor drainage cover and a removable mechanical sealing device. The floor drainage cover 103 is installed on the ground with the surface recess in with the grid level in the drainage pipe on the centre of the floor drainage cover. The grating drain plate 104 can be turned and secured by turning the 2 arrows pointing at each other; one on the grating drain plate 102 and another on the floor drainage cover body 101. The grating drain plate 104 is placed inside the floor drainage cover opening. It recesses in and rotates to secure the grating drain plate 104 to the floor drainage cover 103. With the two arrows aligned at the top grating drain plate 104, it can be inserted and removed from this position.

Figure 2 is a prospective view of the floor drainage cover 103. 202a and 202b are the 2 gaps created on the floor drainage cover 103 with top supporting ring flange for the grating drain plate 104 to recess in with the surface of the floor when lowered into this floor drainage cover. There will be another supporting ring flange 203 at the end of the floor drainage cover 103 to support the removable mechanical sealing device 302a and 302b. This opening is big enough for a normal-sized hand to go through in case of any choking in the main drainage underfloor piping.

Figure 3 shows an exploded view of the full system which comprises 4 key components and the top grating drain plate 104 with multiple openings. This opening is big enough for the fluid and small dirt to flow through but small enough to block big object that can possibly choke up the underfloor piping with waste like rugs and bottles. This grating drain plate 104 have two out-facing 'L' size hook 301a and 301b to create a secured point for it. In the middle is a removable mechanical seal device 302 and its flap 303. These is made of antibacterial material. This mechanical seal device is created for sealing interface between the drain and the surface fluid. The fluid maybe liquid or gas. All these will be placed onto the main floor drainage cover 103. As both the ring flange 203 and the ring flange of the mechanical seal device 302 are circular, a smooth gapless contact remains intact and reduces the chances of insect growth or odour escaping from here. The floor drainage cover 103 can also allow the removable mechanical seal device 302 and its flap 303 to be placed onto the drainage cover 103 and the grating drain plate 104 is able to turn and lock on the top drainage cover 103 and grating drain plate 104 recess in without any gap created. This is the key difference in the design of the new floor drainage cover.

Figure 4 shows a cross-sectional view of the floor drainage cover placed onto the underfloor drain pipe 403. One common design for this underfloor drainage pipe is to have all the subline 401, 402 etc. to be integrated into this main floor drain pipe. These lines are usually shallow and close to the ground. Thus, the floor drainage cover 103 and removable mechanical seal device 302 must not be too deep as these can potentially block the sub-piping.

Figure 5 shows the clear alignment arrows 101 on the grating drainage plate 104 and 102 on the floor drainage cover 103.

Figure 8 shows the cross-sectional view of the main floor drainage cover. 801 shows the ring flange where the grating drain plate 104 will recess in and sit on both the top of the grating drain plate and the drainage floor cover flush. The bottom of this ring flange will be of a gradual slope to allow the grating drain plate with out-facing L-shape hook to turn and lock tight.

CLAIMS

1. A complete floor drainage cover with removal mechanical seal device comprising,
a floor drainage cover to be secured on the ground;
a grating drain plate;
- 5 a removable mechanical seal device that can be placed onto the floor drainage cover, this removable mechanical seal device comprises of an inlet for fluid to flow through and an outlet where this incoming fluid can be channelled out to the ground drain pipe.
2. The floor drainage cover as mentioned in 1, wherein the fluid is a gas or a liquid.
- 10 3. The main floor drainage cover as mentioned in claim 1 and 2, wherein this floor drainage cover is a retaining ring flange to hold the grating drain plate in place and a bottom ring flange opening wide enough to allow hand access. This will have a complete circular ring flange to place a removable mechanical seal device.
- 15 4. The main floor drainage cover as mentioned in claim 1 to 3, wherein the top retaining ring flange bottom track has a gradual slope design to allow the grating drain plate to turn and lock tight.
- 20 5. The removable mechanical seal device as mentioned in claim 1 to 4, wherein this covers the material selection will have antibacterial property by the additional of Titanium Oxide in the master batch.
- 25 6. The device as claimed in 5, wherein the material used contain Titanium Oxide as part of the master batch component to create the antibacterial property.
7. The device as claimed in 5 to 6, wherein the device is capable of being removed and installed in a floor drainage cover opening.
- 30 8. The complete floor drainage cover with the removable mechanical seal device as claimed in any one of the claims 1 to 7, wherein the main floor drainage cover include both the grating drain plate and the removable mechanical seal device.

9. The floor drainage cover as claimed in 1 to 8, wherein the device have indicators to mark the alignment point.

5 10. The device as claimed in any one of the claims 5 to 8, wherein the removable mechanical seal device is capable of being installed in a conventional floor drainage cover.