

SANITARY FLOOR DRAINS

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We have all read the splendid article, printed several times over the years, where the child asked his/her plumbing engineer father, "Daddy, what is a plumbing engineer?" Probably all of us who have spent time as design professionals designing plumbing systems have been asked that very question.

When I began my employment at Jay R. Smith Mfg. Co. my daughter was only three years old. She, along with all the other "Smith Children" have grown up with either mom, dad or in some cases both employed by Jay R. Smith and all have asked at one time or another, "What is a floor drain?" This early awareness of floor drains instilled in the "Smith Children" the desire to look at floor drain grates, cleanout covers, hydrants, etc., to see who the manufacturer may be. In the absence of a floor drain, some have even dropped to their hands and knees to read the cap nuts on the off-the-floor toilet fixtures to see what name is on them. It is really fascinating to watch adults not associated with the plumbing and drainage industry trying to figure out what these youngsters are scrutinizing on the drain grate or cleanout cover. However, most never figure it out.

Various types of floor drains are very important components in the modern plumbing drainage system. Plumbing, in general, is not considered very glamorous by many and when we get down to discussing floor drains, they are close to the bottom rung of the glamour ladder. I would have never dared to hint to my Father that plumbing was not glamorous. He was a licensed master plumber in the State of Georgia and a master craftsman. He required all the children to start to work in the family business at age thirteen. This exposure at an early age instilled that unique sense of plumbing glamour in our hearts and minds. Those of us now employed in the plumbing industry consider plumbing including floor drains to be very glamorous.

Products that serve a useful function each day, without need for service or attention, usually are taken for granted. Actually, the same can be said for people! However, such is the lowly floor drain. Once installed, it performs a vital service indefinitely and usually without need for service or attention. Today's modern construction dictates that we cannot forget or neglect the lowly floor drain, which must be carefully selected, properly installed and maintained after the system is in operation. Many areas in our modern buildings require floor drains which must satisfy high sanitation requirements and conform to the aesthetics of the building. To fulfill those needs, the industry has pioneered and developed a complete line of floor drains, designed specifically to meet modern construction standards and sanitation requirements. The sanitation criteria for such areas mandate specific drains referred to as "Sanitary Floor Drains" or "Sanitary Floor Sinks."

The major feature of a Sanitary Floor Drain/Sink is that the inside of the drain body is coated (sanitized) with Acid Resisting Porcelain Enamel. We have taken the humble floor drain, completely redesigned it and coated it in the same manner as the bathtub, lavatory and many other plumbing fixtures. Some may ask, "Is it really necessary to upgrade floor drains in this manner?" The answer is made obvious when we consider the many cast iron enameled fixtures required in the plumbing industry. Would you consider a cast iron bathtub or lavatory which was painted with an enamel paint? Certainly not! Bathtubs and lavatories, by the nature of their use, require the permanent sanitary protection and beauty which only Acid Resisting Porcelain Enamel can provide. We know that many floor drain applications require the sanitary protection and "good looks" which are provided only by Acid Resisting Porcelain Enamel Coated Sanitary Floor Drains/Sinks.

During the very early years of what is called the "Modern Plumbing Era" a "floor drain" usually was nothing more than a hole in the floor. The main purpose of a floor drain was to conduct surface water away from the surrounding area. When needed, crude covers and grates were put over these holes to prevent sticks, trash and other debris from entering. This arrangement became inadequate as plumbing and building construction grew more sophisticated. Recognizing this inadequacy, the specification drain industry designed and engineered many refinements into floor drains. Today, there is a floor drain to satisfy the performance and aesthetic requirements for all locations in our modern buildings.

Despite the availability of a great variety of functional floor drains, many installations still resort to the "hole in the floor" method. These types of installations tend to place the plumbing industry back again to the year 1900. It is our contention that the floor drain coverage in specifications is critical insuring the right drain is installed in the right place in every building. Increased recognition of the need for proper floor drain application will increase a building's functional efficiency and insure the ultimate in appearance and sanitary safety.

The prime considerations which must be addressed when selecting a floor drain are:

1. *Sanitation* - Will it create any hazardous unsanitary condition or violate a plumbing code?
2. *Performance and Safety*- Will it safely do the job you want it to do? This pertains to flow and loading characteristics.
3. *Aesthetic Considerations*- Will it compliment the area where it is to be installed?

Let's review these three criteria for selection in more depth.

Sanitation: Each floor drain should be designed so that it conforms to existing plumbing code standards. The body must not have hidden crevices and pockets in which food particles and waste matter may lodge. A drain so designed will not encourage the build-up of vermin and offensive odors. The inside of the drain must be free from obstructions which may prevent self-scouring flow through the drain.

The drain body and top must be made of materials capable of withstanding the corrosiveness of the waste which will flow into it. In typical applications, the drain material should last the life of the building.

Performance and Safety: Every floor drain must have a large enough outlet to carry away the anticipated volume of water that will flow into it.

A large top is required to insure fast entrance of the surface water into the drain without causing water ponding in the area to be drained.

The grate selected must have enough top open (free) area for proper drainage yet the size of the openings must not create a safety problem.

Safety is a component of performance which cannot be under-estimated. Grates and covers must be strong enough to withstand the anticipated maximum load which will pass over them. The loading requirements of ASME Standard, A112.6.3-Floor & Trench Drains, paragraph 5. "Top Loading- Classification" should be followed when selecting a grate. The loading requirements are as follows:

Light Duty- All Grates having a safe live load under 2,000 lbs. (900 KG).

Medium Duty- All grates having a safe live load between 2,000 lbs. (900 KG) and 4,999 lbs. (2250 KG).

Heavy Duty- All grates having a safe live load between 5,000 lbs. (2250 KG) and 7,499 lbs. (3375 KG).

Extra Heavy Duty- All grates having a safe live load between 7,500 lbs. (3375 KG) and 10,000 lbs. (4500 KG).

What is a Live Load? Per paragraph 5.2.5 of the referenced ASME/A112 Floor Drain Standard, it states "The maximum safe live load is computed by dividing the load at failure by two." The procedure is to place a 3.5 inch diameter platen in the center of the grate and apply hydraulic loading slowly to the platen until failure.

Each drain must have the proper internal variation (i.e., sediment bucket, etc.) to intercept or screen floating debris, peelings, sand, metal chips or any other miscellaneous solids that it may receive.

Aesthetic Considerations: The part of the drain visible at the finished floor level should blend and harmonize with the surrounding area/finish. It should not detract from the attractiveness of a finished area and should provide a functional appearance in unfinished areas. This can be accomplished by properly selecting:

1. The configuration of the top (round, square, rectangular) to conform with the surrounding area;
2. The shape and layout pattern of the drainage openings in the grate;
3. The material of the top should compliment surrounding trim, especially unfinished areas;
4. Select top materials which have good resistance to corrosion and discoloration. This will prevent damaging corrosion and unsightly staining of the grate and surrounding area.

There are many different drains available to satisfy most selection criteria of sanitation, performance and aesthetics, but there is only one type of drain which can satisfy all the requirements. Where the ultimate in sanitation and appearance are required, a "Sanitary Floor Drain/Sink" should be specified and provided. These are demanding times we live in today with much emphasis placed on diseases, bacteria and chemical dangers that can attack us without warning. Therefore, the need for the sanitary floor drain in food preparation areas is vital.

Where do you need a sanitary floor drain/sink? Visualize a new kitchen-food preparation area of a large school or office building. The walls are tiled with a durable, decorator-colored, ceramic tile. The floors are also furnished with ceramic tile, quarry tile or some other durable/high quality floor material. All the fixtures and appliances are stainless steel. You can see that considerable money has been spent to make this kitchen:

1. Sanitary,
2. Functional
- and
3. Aesthetically Appropriate

A high degree of excellence is demanded in these three categories in order to maintain the physical and mental well being of the personnel who work in the area and those who utilize the facilities. Yet, in the midst of all this functional beauty, why do we often allow loathsome, unsanitary and hazardous floor drains? Should not the floor drains be compatible with the surroundings?

The present and correct way to answer these questions is to insist on the installation of "Sanitary Floor Drains/Sinks". These drains are available, and we should demand that they be used in such critical areas.

Exactly what is a "Sanitary Floor Drain/Sink"? As previously stated, the major feature is its Acid Resisting Porcelain Enamel interior coating. The application of Acid Resistant Porcelain Enamel to any ordinary floor drain is not enough to make it a Sanitary Floor Drain/Sink. The "Sanitary Floor Drain/Sink" has been specially designed for the application of a **Sanitary Acid Resisting Porcelain Enamel** coating. The drain bodies have large radius rounded interior corners and are void of the usual grate recess, pockets and crevices which are common to ordinary floor drains. The absence of recesses, crevices and pockets permits smooth, self-scouring flow through the drain and eliminates any possibility of dirt and food particles being lodged in the drain body.

The "Sanitary" Acid resisting Porcelain Enamel coating presents a smooth, hard, impervious surface which is easy to clean, making these drains ideal for installation in restaurants, hospitals, markets, schools, drug stores and other public buildings where the ultimate in sanitation is required. **Sanitary floor drains/sinks are particularly suitable and should be always used in areas where food handling or processing occurs.**

The material of the top frame and grate is also of vital importance. Nickel bronze grates are recommended for all areas. Nickel bronze will not discolor and its bright "silver" finish is maintained due to the polishing action of traffic passing over the grate. When heavier loadings are anticipated, extra heavy nickel bronze grates are available and should be specified. Cast iron grates with "Sanitary" Acid Resisting Porcelain Enamel coatings are available but should not be installed in areas subjected to foot or other traffic. All Sanitary Floor Drain/Sink top variations are designed to eliminate pockets or hidden crevices. Normal top materials are enameled cast iron, bronze and nickel bronze. For special applications, metals such as stainless steel, monel and everdur are available.

"Sanitary Floor Drains/Sinks" are available with innumerable variations which meet specific job requirements. The models supplied with a flashing flange provide seepage control and a secure anchor for the body in the concrete. They should always be specified for installation in above grade floors. When a waterproofing membrane is used, a flashing clamp device should always be specified. The models supplied without a flashing flange are suitable for installation at grade, where some seepage would not be a problem. See figures 1A and 1B.

Sanitary floor drain bodies have various internal body accessories which provide both utilitarian and protective functions.

Bottom strainers are recommended to intercept debris which may otherwise cause an eventual line stoppage. The dome types are preferred because their design prevents splashing and their large free area provides for adequate drainage and prevents clogging. See figures 2a and 2B.

Sediment buckets are recommended where sediment, debris or other solids are anticipated. The slotted bucket is satisfactory for normal service. The ported mesh-lined bucket should be used in dairies and food processing plants, where smaller particles are anticipated such as vegetable peelings, seeds, cherry pits, etc. See figures 3A, 3B, 4A and 4B.

Bottom strainers and buckets are regularly cast in aluminum. Aluminum has excellent strength and corrosion-resistant qualities, making it ideal for this type of service. Its light weight makes the parts easy to handle and minimizes the possibility of damaging the porcelain enamel of the receptor. When specified, bottom strainers are available in cast iron with Acid resisting Porcelain Enamel coating. When used, extreme care must be taken in handling to prevent damaging the strainer and/or receptor body.

A Sanitary Floor Drain/Sink has many top variations adaptable for use as an indirect waste receptor or as a combined floor drain and indirect waste receptor. The most popular indirect waste receptor variation is the use of a funnel, mounted on the top grate of the sanitary floor drain/sink. Both round and oval funnels are available. See figures 7A and 7B.

When a combined indirect waste and floor drain is required, \square , 3/4 or angle grates are available. Grates and solid covers with center holes are recommended where applicable. Solid gasketed covers should be used where future or intermittent use is anticipated. Stadiums and convention centers, subject to seasonal or periodic use can employ the solid cover variation to good advantage. See figures 5A, 5B, 6A, 6B and 6C.

Up to this point, the discussion has focused on porcelain enameled cast iron. However, for the ultimate in superior sanitation, corrosion resistance, durability and longevity, consider a stainless steel sanitary floor drain/sink. Stainless steel sanitary floor drains/sinks are regularly furnished in Type 304 stainless but can be provided in Type 316. All of the variations and material options aforementioned are applicable to the stainless steel units. Besides the kitchen-food preparation areas, stainless steel sanitary floor drains/sinks are ideal for breweries, dairies, creameries and similar food processing applications.

Caution is emphasized in regards to applications of this type of floor drain/sink. Sanitary floor drains/sinks were developed to fulfill the sanitary need in a kitchen environment. A sanitary floor drain/sink should not be arbitrarily used in a chemical or acid waste application as it is not the proper application. These applications require a special acid resistant coating that usually the manufacturer can provide but they must be informed of the application and the type of chemical or acid being discharged into the drain. Failure to provide this information will result in a mis-application of the drain and some disgruntled building owners/managers.

In summary, the material and design features of the "Sanitary Floor Drain/Sink" make this type of drain mandatory for all installations where food handling or processing is performed. The "Sanitary Floor Drain/Sink" offers complete sanitary protection, easy cleaning, maintenance and the ultimate in appearance. A great feature of the "Sanitary Floor Drain/Sink" is the ease of maintenance. Drain maintenance is a vital operation in food processing or food handling areas. The smooth porcelain enamel interior is easily and quickly wiped clean and treated with a disinfectant. Light weight sediment buckets which collect and retain undesirable food solids are quickly emptied into a garbage can, cleaned and replaced.

References:

Joe M. Soriano, Jay R. Smith Mfg. Co., *Sanitary Drainage*

American Society of Mechanical Engineers, *A112.6.3 Floor & Trench Drain Standard*.

Acknowledgments:

Jay R. Smith Mfg. Co., *Illustrations*

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BODY WITH ANCHORING OR SEEPAGE CONTROL FLANGE (Fig. 1A). This flange rigidly anchors the body in the concrete slab. Body is provided with holes to control the seepage which occurs due to normal separation between the concrete and the body. Waterproofing membranes are used in many floors on grade. They should always be used in floors located above grade. When a membrane is used, flange and optional flashing clamp (Fig. 1B) must be specified.

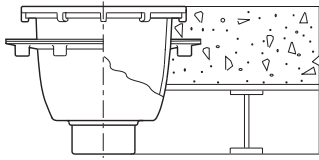


Fig. 1A

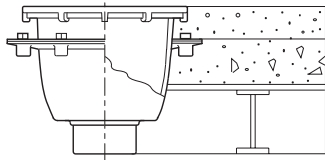


Fig. 1B

Dome and Flat Bottom Strainers: Dome Type (Fig. 2A) are preferred because their hemispherical design greatly reduces splashing and the large free area prevents clogging, and assures maximum flow. **Flat Type** (Fig. 2B) are recommended only when a bottom strainer is required for installation in A.R.C. models beneath aluminum buckets where there is insufficient clearance to utilize the dome type. This optional bottom strainer protects the waste line when bucket is removed.

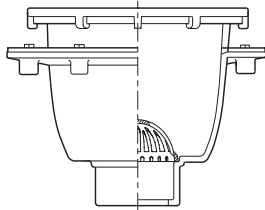


Fig. 2A

Dome Bottom Strainer

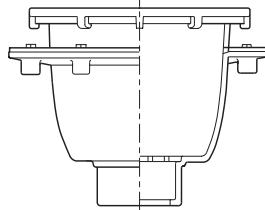


Fig. 2B

Flat Bottom Strainer

Perforated or Slotted Sediment Buckets: Both are suitable for normal installations to intercept and retain foreign materials and solids such as bones, pits, scrap, peelings and other commonly encountered debris. Perforated buckets (Fig. 3A) are regularly furnished with stainless steel models, and slotted buckets (Fig. 3B) with A.R.C. models. Perforated models have 1/4" round holes on 1/2" centers and will provide superior solids retention.

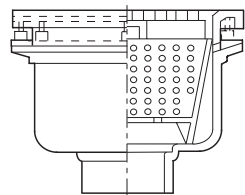


Fig. 3A

Perforated Sediment Bucket

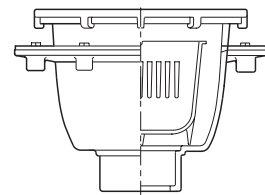


Fig. 3B

Slotted Sediment Bucket

Solid Bottom Ported Buckets: Are particularly suitable for special applications such as can washing, dairy, creamery and potato peelings drains. The bottom portion of the bucket is solid except for four 1/4" drain holes which drain the bucket at the end of a discharge cycle. A ported opening or area is provided at the top of each side of the bucket. Stainless steel buckets (Fig. 4A) are perforated with 1/4" holes on 1/2" centers. Aluminum buckets (Fig. 4B) have ports which are lined with 1/8" mesh stainless steel screen. With this type of bucket, even small solids in suspension will settle to the bottom of the bucket and be retained. This prevents any possibility of line stoppage.

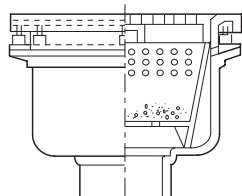


Fig. 4A

Solid Bottom Ported Bucket with Perforated Ported Area

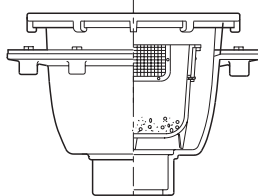


Fig. 4B

Solid Bottom Ported Bucket with Mesh Lined Ports

TOP GRATES & COVERS FOR NON-TRAFFIC AREAS

When drains are installed in areas where they are not subject to pedestrian or other traffic, these are usually indirect waste receptor drain applications. The basic use is the receptor/body, either stainless steel or A.R.C. cast iron, less top (Fig. 5A) or A.R.C. body with nickel bronze top less grate (Fig. 5B). When there is danger of debris entering the receptor, the use of sediment buckets (Fig. 3A-4B) should always be considered

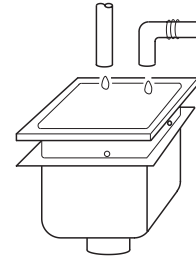


Fig. 5A
Less Top

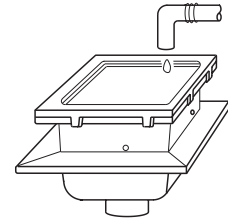


Fig. 5B
With Rim Less Grate

For applications where there is danger of someone stepping into the open top of the receptor, specify half grates (Fig. 6A) and three-quarter grates (Fig. 6B) and grates with center hole (Fig. 6C). These allow the indirect waste to be discharged into the open portion, preventing splashing while protecting balance of the top area with grating.

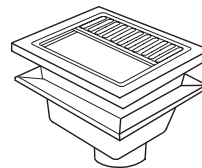


Fig. 6A
1/2 Grate

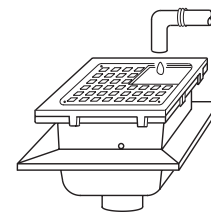


Fig. 6B
3/4 Grate

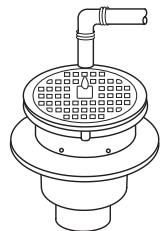


Fig. 6C
Center Hole Grate



Fig. 7A

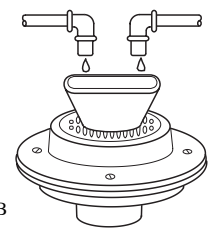


Fig. 7B

The advantage of this type drain is that the funnel prevents splashing of the discharged waste, while the exposed portion of the grate functions as a floor drain. The common method of mounting the funnel allows it to be centered on the grate or placed in any other desired location. Round funnels are used for single pipe discharge (Fig. 7A). Oval funnels are usually used for multiple pipe discharge (Fig. 7B). **Should these drains be used to receive indirect waste from food handling equipment, it is recommended that they be specified with galvanized body, as this gives the maximum in sanitation for this type of drain.**