FLOOR DRAINS
TECHNICAL DATA

HOW TO SELECT A FLOOR DRAIN

Floor drains are primarily used for inside locations where the flow rate into the drain can be anticipated and for outside areas where rainfall intensity dictates sizing. Drains should be selected with sufficient top size and grate free area to pass the anticipated flow. Grate free area is defined as "the total area of the drainage openings in the grate." The drain outlet should be sized large enough so that it will safely pass the maximum flow through the grate, without creating water buildup.

Sizing and Location—For most indoor locations, the grate free area should be 1 1/2 times the transverse area of the connecting pipe. The number and location of drains are based on the configuration of the floor plan, type of operation and location of equipment. Location and number of floor drains required can be determined only after careful review of the plans and anticipated building use.

Floor drains or area drains, when used to drain exterior areas, should have an open area equal to twice the transverse area of the connecting pipe (Table 1.) See roof drain section for rainfall and sizing data (Pg. 1-03).

SELECTING THE DRAIN

After the top size is determined based on anticipated flow into the drain, the following points should be considered when making the final selection of the floor drain.

Selection of Top (Based on Anticipated Traffic)—Establish the maximum anticipated traffic (loading) which will pass over the grate and select the grate type which will support that load. Each drain shown in this section has a description listing the type of load it will take. The categories listed are for various drains in respect to grate loading. The load classifications are in accordance with the American National Standards ASME A112.21.1M.

ASME Ratings are as follows:

• Light Duty—All grates having safe live load under 2,000 lbs. (900 KG)
• Medium Duty—All grates having safe live load between 2,000 lbs. (900 KG) and 4,999 lbs. (2250 KG)
• Heavy Duty—All grates having safe live load between 5,000 lbs. (2250 KG) and 7,499 lbs. (3375 KG)
• Extra Heavy Duty—All grates having safe live load between 7,500 lbs. (3375 KG) and 10,000 lbs. (4500 KG)

The above categories are given as a guide only. Conditions of use, load concentrations, installations, etc., can affect results and service. For unusual applications, consult the factory.

After the weight loading capacity is established, a suitable drain can be selected.

Illustrated below are various types of grate designs which will be mentioned throughout the catalog.

Selection of Top Material—(Unfinished Areas)—Drains located in heavy traffic areas should be specified with heavy duty cast iron grates. In areas where shock loads are anticipated, a ductile iron grate should be specified in lieu of the cast iron grate. Cast iron is acceptable for most unfinished areas such as warehouses, loading docks, boiler rooms and similar areas.

( Finished Areas )—Most drains are available with nickel bronze or bronze tops to match the surrounding trim in finished areas. Usually finished areas require light duty or medium duty tops.

( Finished Areas with Increased Load )—Many finished floor areas are subject to increased loadings. Examples are convention centers, equipment showrooms and industrial plants. Heavy duty cast iron tractor grates can be specified with bronze or nickel bronze veneered tops. (Specify Fig. No. 2120, 2140, 2250, etc.)

Top Shape—Round, square or rectangular styles are available to blend with all types of construction and floor patterns. The round top is the most flexible type since it can be easily oriented to most floor patterns.

Body Selection—Body depth is proportioned to the top size. Many Smith floor drains can be specified with various body depths. The deeper body is desirable when unusually large amounts of water are to be drained or an extra large sediment bucket is required.

Most floor drain bodies are available with a flange for either anchoring the drain in the floor slab or for use as a flashing flange in upper floors and waterproofed areas. Many Smith drains are regularly furnished with a flanged body and a combination "top flashing collar" which can be used to clamp the waterproof membrane.

Recommended Grate Free Areas for Various Outlet Pipe Sizes

<table>
<thead>
<tr>
<th>Nominal Pipe Size, IN</th>
<th>Transverse Area of Pipe, SQ IN</th>
<th>Minimum Flow Requirements (Interior Areas) SQ IN</th>
<th>Maximum Flow Requirements (Exterior Areas) SQ IN</th>
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<tbody>
<tr>
<td>1 1/2</td>
<td>2.04</td>
<td>3.06</td>
<td>4.08</td>
</tr>
<tr>
<td>2</td>
<td>3.14</td>
<td>4.71</td>
<td>6.28</td>
</tr>
<tr>
<td>3</td>
<td>7.06</td>
<td>10.59</td>
<td>14.12</td>
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<tr>
<td>4</td>
<td>12.60</td>
<td>18.90</td>
<td>25.20</td>
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<td>5</td>
<td>19.60</td>
<td>29.40</td>
<td>39.20</td>
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<tr>
<td>6</td>
<td>28.30</td>
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<td>56.60</td>
</tr>
<tr>
<td>8</td>
<td>50.25</td>
<td>75.38</td>
<td>100.50</td>
</tr>
</tbody>
</table>

Table 1

Recommended Grate Free Areas for Various Outlet Pipe Sizes

- Grate will not tilt out of drain body when heavy moving loads pass over it.
- Additional Perimeter Drainage Openings

"SAFE-SET" BUCKET AND GRATE

Grate will not tilt out of drain body when heavy moving loads pass over it.
The Prefix DX designates a wide flange that can be furnished on certain Smith floor drains. This flange receives the membranes and coatings of a waterproof floor covering system. These coverings are thin coatings which are installed in a series of trowel coats. The covering forms its own membrane, flashing and durable traffic surface. The wide flange is regularly furnished 4” wide. The usual covering is approximately 3/16” thick and may be applied over many substrates such as concrete, gypsum or wood decks. This type of covering is particularly adaptable to flat roofs which are used for recreational purposes, balconies, area ways, plazas, sun decks, floors and corridors.

When a DX flange is required on drains other than those shown in this section, the prefix DX must be used with the figure number. The flange will be 4” wide (minimum) with a 3/16” lip regularly furnished. If the waterproof deck covering is greater or less than 3/16”, the lip dimension must be specified or the drain has to be set at the proper elevation by the plumbing contractor to compensate for these differences. Roughing dimensions of the body must be adjusted accordingly. Drain body should be set low enough to permit “dimpling” of the area surrounding the drain.

BUCKET VARIATIONS

Some job applications require drains with buckets to intercept and collect debris such as solid objects and leaves so the waste system is protected. Smith engineers have designed various types of buckets for different applications to accomplish this purpose. NOTE: Where a bucket is not available, a dome bottom strainer or flat bottom strainer may be used to protect the waste system.

SOLID SUSPENDED BUCKET WITH PORTED OPENINGS

This bucket is ideal for drains which are located in areas where a large amount of debris is anticipated. It is particularly useful in areas such as vegetable storerooms where vegetables are pre-cleaned and a considerable amount of leaves and stalks are washed into the drain. The solid bottom of this bucket retains this type of solid matter while the overflow is discharged through the screens in the top of the bucket.

DEEP SUSPENDED SLOTTED BUCKET

Used where large leafy objects such as peeling, leaves and paper are to be intercepted. When wetted down, these types of solids will compact at the bottom of the bucket. Slots run completely up the sides of the bucket to offer complete drainage even when the bottom section is filled with debris.

SOLID FREE STANDING BUCKET

Used where heavy materials such as sand, stones and chips are to be intercepted and separated from the drainage water. When sand laden drainage water enters the bucket, the sand falls to the bottom and the clear water flows over the top of the bucket into the waste line.

DRAIN GASKET INSTALLATION DATA

Jay R. Smith Speedi-Seal (Fig. 9502) and Speedi-Set (L) gaskets are available for use with cast iron, plastic, steel or glass pipe. Installation of your floor drains using Speedi-Seal or Speedi-Set can represent a significant reduction in time and labor costs over conventional caulking or NO-HUB installations.

SPEEDI-SEAL GASKET WITH FIG. 9239 CAULK SUPPORT STRAP

The caulk support strap eliminates the need to search for supports for the drain during the caulking operation and the need to purchase expensive riser clamps. Its unique design allows it to be used on 2, 3 or 4” service weight or extra heavy pipe. The installer secures the strap in place, lubricates the plain end of the spigot, then rests the inside caulk outlet drain on the caulk support strap. The strap supports the drain body weight and the force created by the caulking operation without slipping. The inside surface of the Speedi-Seal gasket is then lubricated, pressed in place down over the pipe and lightly tapped until flush with the top of the pipe. Installation is fast and simple and the caulk support strap may be left in place or reused.

SPEEDI-SET OUTLET TYPE L

Speedi-Set drains are available with most bottom outlet models by specifying (L) and piping material used. Service weight (SW) is regularly furnished or specify extra heavy (LXH). The Speedi-Set joint consists of a NO-HUB outlet body and a factory inserted extra heavy or service weight Speedi-Set neoprene gasket. The installer simply lubricates the plain end of the spigot and the inside of the gasket, then presses the drain body down over the pipe until contact is made with the internal stop of the gasket. The installation eliminates the need for hot lead, caulking irons, NO-HUB clamps, etc.

APPLICATION CHART FOR SPEEDI-SEAL AND SPEEDI-SET GASKETS

<table>
<thead>
<tr>
<th>JAY R. SMITH NO.</th>
<th>NOM. PIPE SIZE &amp; DESC.</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
<th>CAST IRON PIPE</th>
<th>ABS</th>
<th>PVC</th>
<th>PVC THRU WALL</th>
<th>STEEL</th>
<th>COPPER</th>
<th>GLASS</th>
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<td>3.56</td>
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<td>9502SW03</td>
<td>2.125 x 16”</td>
<td>0.190</td>
<td>4.82</td>
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<td>X</td>
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<tr>
<td>9502SW04</td>
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<td>0.245</td>
<td>6.21</td>
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<td>X</td>
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<td>9502SW05</td>
<td>2.125 x 24”</td>
<td>0.300</td>
<td>7.62</td>
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<td>X</td>
<td>X</td>
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<td>9502SW06</td>
<td>2.125 x 28”</td>
<td>0.355</td>
<td>8.99</td>
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<td>9502SW08</td>
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<td>11.81</td>
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<td>9502SW09</td>
<td>2.125 x 40”</td>
<td>0.520</td>
<td>13.21</td>
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<td>X</td>
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<tr>
<td>9502SW10</td>
<td>2.125 x 44”</td>
<td>0.575</td>
<td>14.58</td>
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<tr>
<td>9502SW11</td>
<td>2.125 x 48”</td>
<td>0.630</td>
<td>15.97</td>
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<tr>
<td>9502SW12</td>
<td>2.125 x 52”</td>
<td>0.685</td>
<td>17.36</td>
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<table>
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<tr>
<th>PIPE OD TOLERANCE RANGE</th>
<th>GASKET-PIPE COMPATIBILITY</th>
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<tbody>
<tr>
<td>SW = SERVICE WEIGHT</td>
<td>LXH = EXTRA HEAVY</td>
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</table>

Variations to meet particular job requirements are available. The illustrations shown below are some of the more common variations.

- **Suffix -B** Sediment Bucket
- **Suffix -D** Dome Grate
- **Suffix -H** Hinged Grate
- **Suffix -P** Trap Primer Connection
- **Suffix -S** Square Top
- **Suffix -U** Vandal Proof Screws

**OPTIONAL VARIATIONS**

Trap Primer Connection P075 (1/2") Regularly Furnished. 

Flat Head Socket Machine Screw.
Adjustable Top—The Smith 2005/2010 Series of floor drains are available with over 100 different strainer heads. Strainer heads have a 3 3/4 - 12 threaded shank which threads into flashing collar. This type of drain is particularly adaptable to two-pour construction, such as toilet rooms, shower rooms, locker rooms and other light duty finished areas. Strainer head is easily adjusted when tile floor is being set.

Reversible flashing collar in low position permits adjustment of the strainer to as low as 3/4" (measured from top of body pan to finished floor). This low position is particularly adaptable for installations where ceramic tile is applied directly to the slab. With collar in high position, sufficient adjustment is available for all normal two-pour installations. Usually the normal sand and cement fill and ceramic tile measures approximately 1 1/2". For unusually deep floor fills or unique construction, additional height can be obtained by using a Suffix -X Extension Adaptor.

Adjustable Top and Extension—Smith has available adjustable drains in the 8 1/2" and the 12" top sizes. Both sizes are available with light duty, medium duty, or heavy duty tops. See Table 2 below for variations.

Adjustable drains are particularly useful in areas where the finished floor elevation may vary or is not immediately determined. Additional adjustable extension sleeve is available for extra deep roughing conditions (Specify Suffix -E).

### Table 2

<table>
<thead>
<tr>
<th>TYPE TOP</th>
<th>SIZE TOP</th>
<th>FIG. NO.</th>
<th>MIN</th>
<th>MAX</th>
<th>MIN</th>
<th>MAX</th>
<th>C</th>
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<tbody>
<tr>
<td>&quot;SAFE-SET&quot;</td>
<td>8 1/2 DIA</td>
<td>2350</td>
<td>1 1/4</td>
<td>2 3/4</td>
<td>3 3/8</td>
<td>5 1/4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>12 DIA</td>
<td>2360</td>
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<td>3</td>
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<td>MEDIUM DUTY</td>
<td>8 1/2 DIA</td>
<td>2310</td>
<td>1 1/4</td>
<td>2 3/4</td>
<td>3 3/8</td>
<td>5 1/4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>12 DIA</td>
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<td>HEAVY DUTY</td>
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<td>2330</td>
<td>1 3/4</td>
<td>3</td>
<td>2 3/4</td>
<td>4 3/4</td>
<td>2 1/4</td>
</tr>
</tbody>
</table>

NOTE: Extensions can be stacked for increased maximum adjustment.

**FEATURES FIG. 2010**

- REVERSIBLE FLASHING COLLAR designed to receive all variations of SMITH strainer heads. Permits vertical adjustment for strainer and provides positive clamp of waterproofing membrane.
- TURN-STYLE SLOTS permits easy assembly of collar without removal of non-corrosive bolts.
- AUXILIARY INLET PAD tapped for trap primer connection when specified.
- 2 PIECE BODY design eliminates need for separate flashing device.
- SEEPAGE OPENINGS permit seepage into drain body.
- CAULK OUTLET regularly furnished, NO-HUB, Speedi-Set or Threaded Outlets when specified.

**EXTENSION ADAPTOR**

**FUNCTION:** Used when a strainer head must be raised to accommodate deeper floor fill.

**MATERIALS:**
- Cast Bronze XCB
- Galvanized Cast Iron XG

NOTE: Extensions can be stacked for increased maximum adjustment.