

MIFAB Floor Drain Selection Guide

Floor drains and accessories combine to form the upstream or entrance terminals of a building's floor drainage system. Area drains serve in a similar capacity for drainage of surface areas immediately adjacent to the building. The selection and specification of drains for interior floor areas and exterior surface areas merit careful consideration.

Such factors as size, shape, function and anticipated drainage requirements of the area must be taken into account when planning for adequate and proper drainage of the area. These elements are of equal importance when sizing and locating the drains and drainage lines to which they are connected.

Furthermore, many factors concerning plumbing and building codes apply, so it is recommended that they be consulted at the outset of selection and specification considerations.

SIZING

The potential volume of drainage to be accommodated by drains serving interior areas can, as a rule, be calculated with reasonable accuracy using the total amount of water within the area as a basis for sizing. The area's function as well as types of water use equipment used within the area must be considered. For example, a public restroom, with its numerous types of water use fixtures, must include drains sized and located to handle potential overflow due to stoppage as well as routine custodial waste from cleaning byproducts. In addition to plumbing fixtures, water requiring floor drainage emanates from man's sources such as run-off from vehicles in garage areas, condensate waste and processed water discharge from equipment hose stations, and emergency drainage as from sprinkler systems or spills. It is a good practice to provide floor drains in any area where a water source is located. Moreover, floor drains should be adequately sized and strategically located to avoid standing water on the floor, a potentially hazardous condition. Sizing of area drains for surfaces adjacent to the building is normally based on rainfall and size of the area to be drained. Information concerning such sizing is provided in the MIFAB Roof Drain section of this catalog. Placement of area drains depends on the topography of the area with drains placed at the low points where run-off is anticipated.

SPECIFIC POINTS FOR CONSIDERATION

After the preceding drainage requirements have been resolved and the drainage piping system is developed, the proper floor and area drains to serve the system must be selected and specified. There are a number of points to consider for such selection, knowledge of which will be of assistance in arriving at the proper decision. Comprehensive information on each of the following points for consideration is essential:

- location requirements
- floor construction
- sizing considerations
- load bearing
- materials and appearance
- drain outlet connections
- trapping of sediments
- extensions
- back flow prevention
- indirect waste

LOCATION REQUIREMENTS

The locations within and adjacent to the building structure which require provisions for drainage are many. Some significant locations for which drains must be selected are toilet and shower rooms, boiler and equipment rooms, basements, garage and parking areas, kitchens, laundry, utility and service rooms, elevator pits, entry areas, machining and processing areas, refrigeration rooms.... the list goes on and on. Drains should be considered and selected for any location where water is supplied and surface drainage must be accommodated.

FLOOR CONSTRUCTION

Floor construction has a distinct influence on drain selection and therefore must be considered at the outset of the selection process. Such elements as slab type and thickness, surface finish, depth of fill, waterproofing membrane and/or finishing materials will influence the selection.

COMPLIANCE WITH ADA

In order to comply with the American Disabilities Act (ADA), drains located in walking surfaces or along accessible routes must have grate openings no grater than ½ in. (13mm) in one direction. If the grate openings are elongated, then the openings must be oriented so that long dimension is perpendicular to the dominant direction of travel.

MIFAB Floor Drain Selection Guide (Cont,d)

SIZING CONSIDERATIONS

The size of the floor drains is important as it affects the number of drains required and the amount of water which can be efficiently drained. As a general reference, floor drains should be able to handle an overflow condition of water that may be discharged onto the floor. The chart below indicates water outlets and the demand (GPM/LPM). requirements for a drain.

Type of Water Outlet	Demand (GPM/LPM)
Aspirator (Operating Room or Laboratory)	2.5 [9.5]
Ball Cock in Water Closet Flush Tank	3.0 [11.4]
Bath Faucet, 1/2" [13mm]	5.0 [18.9]
Dishwashing Machine (Domestic)	4.0 [15.1]
Drinking Fountain Jet	0.75 [2.8]
Hose Bibb or Sill Cock, 1/2" [13mm]	5.0 [18.9]
Laundry Faucet, 1/2" [13mm]	5.0 [18.9]
Laundry Machine (8 lbs. [4 kgs or 7 kgs])	4.0 [15.1]
Ordinary Lavatory Faucet	2.0 [7.6]
Self-Closing Lavatory Faucet	2.5 [9.5]
Shower Head, 1/2" [13mm]	5.0 [18.9]
Sink Faucet 3/8" [10mm] or 1/2" [13mm]	4.5 [17.0]
Sink Faucet, 3/4" [19mm]	6.0 [22.7]
3/4" [19mm] Flush Valve (15 PSI Flow Pressure) [103 kPa]	15.0 [56.8]
1" [25mm] Flush Valve (15 PSI Flow Pressure) [103 kPa]	27.0 [102.2]
1" [25mm] Flush Valve (25 PSI Flow Pressure) [172 kPa]	35.0 [132.5]

The maximum recommended flow rating is based upon the depth of the drain, size of outlet connection and the grate free area. In addition, we selected a head buildup of water on the floor at maximum flow conditions that range as follows:

Outlet Size	Head above floor
2"	1/4" max.
3"	1/4" to 1/2"
4"	1/4" to 1"
6"	1/2" to 1 1/2"
8"	3/4" to 2"

Optional variations such as sediment buckets, secondary strainers and internal backwater valves will reduce maximum flow ratings. A rule of thumb that may be applied in such cases is as follows:

Outlet Size	Reduction in flow rating
2"	10%
3"	20%
4"	40%
6"	60%

FREE AREA CALCULATION

A drain's top size, regardless of its shape -round, square, etc.-influences the number and size of openings between support members, which in total account for the grate's open or the free area. Normally, the larger the top, the greater the free area. Free area is the key factor used in evaluating the grate's ability to permit sufficient drainage to enter the drain for efficient utilization of the drainage system and prevent build-up of water on the floor or area served by the drain. Codes and standards stipulate that for proper drainage, interior floor drains should have a grate free area equal to one and one-half times the transverse area of the connecting pipe and exterior area drains, subject to rain-fall, two times that of the connecting pipe. Thus, it is important in selection of floor and area drains to consider the top and outlets sizes as they relate to each other. The following tabulation, taken from ANSI Floor Drain Standard A112.6.3-2001 provides at a glance the grate free area requirements for outlet sizes, thus connection pipes, based on the ratios given.

DRAIN OUTLET CONNECTION SIZE (SQ. INCHES)	TRANSVERSE AREA CONNECTING PIPE (SQ. INCHES)	GRATE FREE AREA, MINIMUM FLOW (SQ. IN.) INTERIOR AREAS	GRATE FREE AREA, MAXIMUM FLOW (SQ. IN.) EXTERIOR AREAS
2	3.14	5.0	6.50
3	7.06	11.0	14.0
4	12.5	18.0	25.0
5	19.6	30.0	40.0
6	28.3	42.0	56.0
8	50.25	75.38	100.50

The free area of floor drains should be twice the transverse area of the drain outlet.

FLOW RATE CALCULATION

If the water pressure head above the floor and the required flow rate are known, the required grate free area of the drain can be calculated using the following equation:

$$Q = 448.2 \cdot C_d \cdot A \cdot \sqrt{2 \cdot g \cdot h}$$

where

- Q** = Flow rate (Gallons per Minute)
- C_d** = Discharge Coefficient = 0.6
- A** = Free area (open area) of grate (ft/s²)
- g** = Acceleration (32.2 ft/s²)
- h** = Head above the floor (ft)

This equation can be solved for A:

$$A = \frac{Q}{448.2 \cdot C_d \cdot \sqrt{2 \cdot g \cdot h}}$$

An Example: A head of 0.5 in. above the floor with a required flow rate of 15 gallons per minute and an average discharge coefficient of 0.6 gives a required grate free area of 0.034 sq. ft. [4.92 sq.in.].

MIFAB Floor Drain Selection Guide (Cont'd)

LOAD BEARING

Once installed, floor drains become integral components of the floor or area in which they are located. Therefore, the drain selected for each installation must have tops or grates capable of sustaining the type of load to be supported by the floor. This is particularly significant where drains selected are installed in traffic locations. It is recognized that top-loading requirements vary with the location, type of construction and service conditions. These requirements for floor and area drains are addressed in American National Standards Institute, Floor Drains, ANSI A112.21.1M-1991 with the following five top loading classifications:



F1000 Series

All of MIFAB's floor drains are available with heavy duty cast 304 Stainless Steel Strainers to eliminate dishing and corrosion. There is no extra cost for MIFAB's Stainless Steel floor drains compared to the industry standard light duty nickel bronze or brass.

LIGHT DUTY - all grates having safe live load under **2000 lbs.**

MEDIUM DUTY - all grates having safe live load between **2000 and 4999 lbs.**

HEAVY DUTY - all grates having safe live load between **5000 and 7499 lbs.**

EXTRA HEAVY DUTY - all grates having safe live load between **7500 and 10,000 lbs.**

SPECIAL DUTY - all grates having safe live load over **10,000 lbs.**



F1320 Series

All of MIFAB's area drains are manufactured with "Special Duty" rated ductile iron, adjustable tractor grates. Grates will not tilt out of drain body when heavy traffic loads pass over.

The safe live load is computed by dividing the load at failure by two when the grate is loaded in accordance with the test procedure stipulated in the Standard. A 3 1/2" (89) diameter platen was used during the load rating test and applied to the center of the grate. Using these top-loading classifications as a guide when loading requirements for the drains in a given location have been determined, the duty type required can be selected. MIFAB floor drains in this catalog are duty rated as an aid to selection. For additional information where a rating is not clear for unusual service conditions, contact MIFAB Customer Service.

MATERIALS AND APPEARANCE

Cast iron is the primary material used in the production of floor drain components. MIFAB floor and area drain bodies are cast in gray cast iron having a tensile strength of 25,000 to 30,000 psi. The ASTM specification for MIFAB's gray iron castings is A 48-83, class 25. **Cast ductile iron tractor grates are standard with MIFAB.** This is an advantage in installations such as warehouses, equipment rooms, garages, basements, and service and machine areas that are in locations where severe service conditions, such as shock or impact loading are factors.

The durability of ductile iron grates virtually eliminates replacement cost. The corrosion resistance of ductile iron grates is far superior to cast iron, galvanized iron or steel. Ductile iron grates also provide maximum safety, prevent property damage and personal injuries as a result of broken or missing grates. In addition to our ductile iron grates for unfinished areas, MIFAB

manufactures adjustable strainers of type CF8 (304) cast stainless steel. For larger capacity drains, with 7" to 24" top assemblies, MIFAB provides cast or fabricated stainless steel veneers polished to a number 4 satin finish. The use of stainless steel versus conventional nickel or polished bronze ensures that there will be no broken or dished grates or any discoloration due to oxidization.

MIFAB stainless steel top assemblies and strainers are priced the same as our conventional nickel bronze products.

METAL	CAST IRON	DUCTILE IRON
Specification	Class 20	60-45-10
Tensile Strength (PSI)	25/30,000	60/80,000
Yield Strength (PSI)	NIL	10% to 25%
Modulus of Elasticity	16 x 10 ⁶	24 x 10 ⁶

MIFAB Floor Drain Selection Guide (Cont'd)

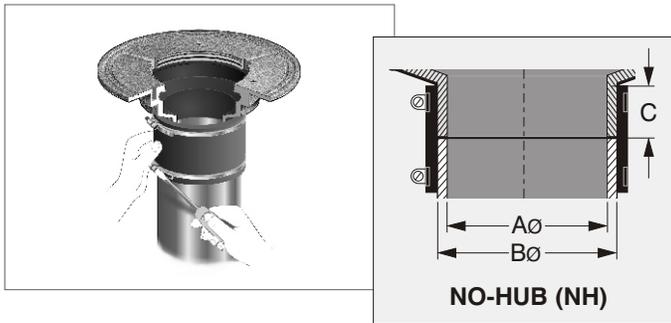
DRAIN OUTLET CONNECTIONS

Floor drains, are available in a variety of outlet connection types. The drain's outlet connection must be compatible with those of the drainage piping system to which it is connected. The most commonly employed connection types are as follows:

1. NO-HUB (NH) (A/K/A Mechanical Joint)

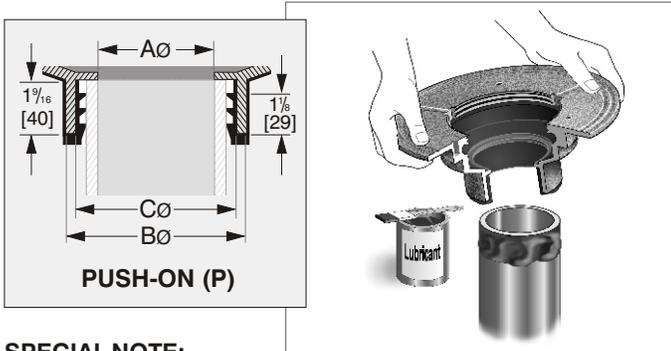
The most widely used connection. A No-Hub connection is achieved by butting No-Hub soil pipe or plastic pipe to the bottom of the drain and securing it with a NH joint clamp. (Clamp furnished by others.)

Unless specified otherwise, all of MIFAB drains are shipped standard with No-Hub connections.



2. PUSH-ON (P)

MIFAB "Push-on" is a unique labor saving compression gasketed connection designed to simply push on the stub end of the pipe. The Push-on drain body and gasket can be utilized with plastic, steel, No-Hub and service weight soil pipe. A unique pipe stop cast in each MIFAB Push-on drain body ensures that water will not accumulate around the connecting pipe. Specify suffix P for MIFAB's Push-on connections.

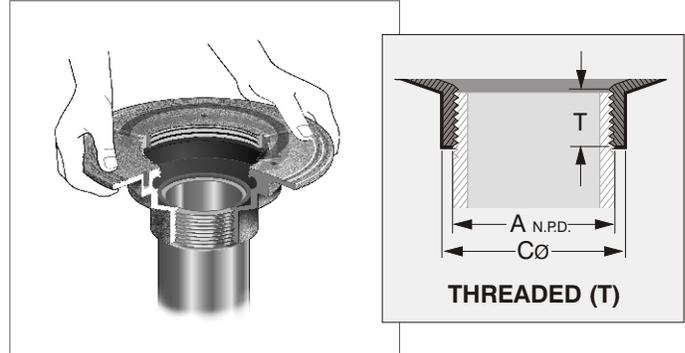


SPECIAL NOTE:

MIFAB "Push-on" gaskets are designed for use exclusively with MIFAB drainage products. They are not sold separately and all warranties either expressed or implied would be forfeited if used in other than a MIFAB drainage product.

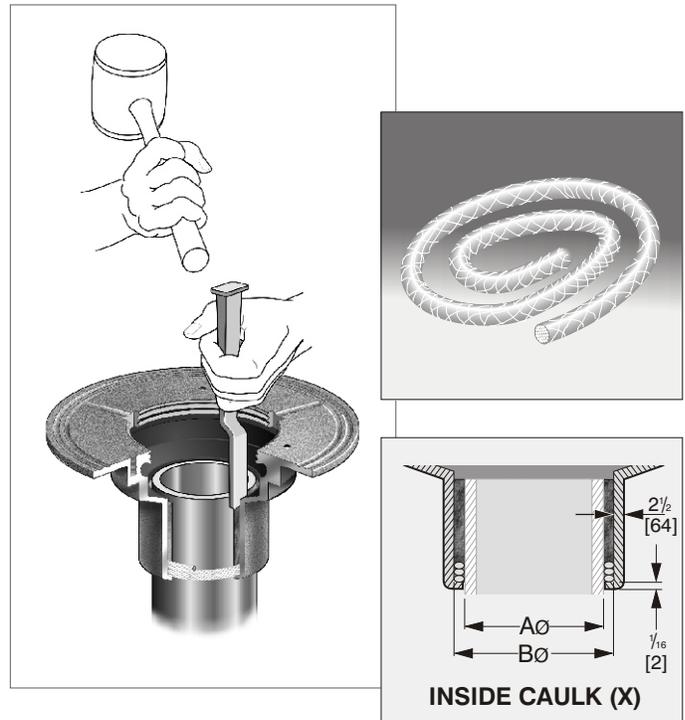
3. THREADED (T)

MIFAB Iron Pipe Threaded connection is an old industry standard. The female (NPT) threaded outlet is often specified on industrial and institutional applications. Specify suffix T for MIFAB's threaded connections.



4. INSIDE CAULK (X)

The Inside Caulk drain outlet connection is a bottomless hub into which the drainage pipe is inserted. The bottom of the outlet is sealed with oakum in the annular space between the pipe and the hub and the connection is then sealed with melted lead. Inside caulk connections are compatible with No-Hub, service weight and extra heavy soil pipe. They can also be used with ABS and PVC pipe. Specify suffix X for MIFAB's inside caulk connections.



MIFAB Floor Drain Selection Guide (Cont'd)

5. PVC/ABS Socket (PVC=-30, ABS=-31)

Socket weld connections are proven installation time saver solutions. They provide a sanitary and resistant connection to the piping system for specialized applications.

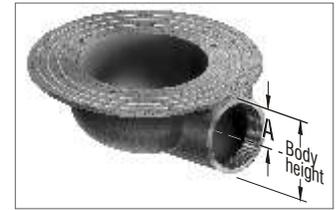
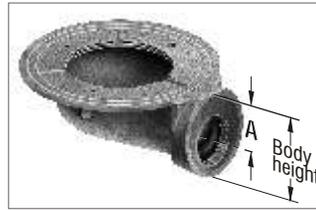


A1 BODY OUTLETS	Dimensions in inches and [mm]		
1. NO-HUB (NH)	A	B	C
2" [51mm]	2 [51]	2-3/8 [60]	1-1/8 [29]
3" [76mm]	3 [76]	3-3/8 [86]	1-1/8 [29]
4" [102mm]	4 [102]	4-3/8 [111]	1-1/8 [29]
5" [127mm]	4-15/16 [125]	5-5/16 [135]	1-1/2 [38]
6" [152mm]	5-15/16 [151]	6-5/16 [160]	1-1/2 [38]
2. PUSH-ON (P)	A	B	C
2" [51mm]	2 [51]	3-3/8 [86]	3 [76]
3" [76mm]	3 [76]	4-3/8 [111]	4 [102]
4" [102mm]	4 [102]	5-1/2 [140]	5-1/8 [130]
3. THREADED (T)	A	T	C
2" [51mm]	2 [51]	9/16 [14]	3-1/4 [83]
3" [76mm]	3 [76]	3/4 [19]	4-1/2 [114]
4" [102mm]	4 [102]	15/16 [24]	5-5/8 [143]
4. INSIDE CAULK (X)	A	B	C
2" [51mm]	2-5/8 [67]	3-1/16 [78]	-
3" [76mm]	3-3/4 [95]	4-3/16 [106]	-
4" [102mm]	4-3/4 [121]	5-3/16 [132]	-
5. PVC/ABS SOCKET (-30,-31)	A	B	C
2" [51mm]	3-3/8 [88]	2-3/8 [60]	-
3" [76mm]	3-3/8 [89]	3-3/8 [89]	-
4" [102mm]	4-3/8 [114]	4-3/8 [114]	-

A1-90, A2-90

Typifies a MIFAB floor drain with a 90° side outlet. Drains of this type are designed for applications which require horizontal piping where depth is a problem. The (-90) 90° side outlet option is available on all MIFAB floor drains that use the A1, A2 and A3 bodies. See chart below for dimensional data.

A1-90 BODY DIMENSIONS			
PIPE SIZE	BODY HEIGHT	"A" DIMENSION THREADED OUTLET (T)	"A" DIMENSION NO HUB OUTLET (NH)
IN MM	IN MM	IN MM	IN MM
2 (51)	4 (102)	2 1/4 (57)	2 1/4 (57)
3 (76)	4 3/8 (111)	3 (76)	3 (76)
4 (102)	6 (152)	3 1/4 (82)	3 1/4 (82)
A2-90 BODY DIMENSIONS			
2 (51)	5 3/4 (131)	4 1/4 (108)	3 5/8 (92)
3 (76)	5 3/4 (131)	3 3/4 (86)	2 3/4 (69)
4 (102)	5 3/4 (131)	3 1/4 (82)	3 (76)



A2 BODY OUTLETS	Dimensions in inches and [mm]		
1. NO-HUB (NH)	A	B	C
2" [51mm]	2 [51]	2-3/8 [60]	1-1/8 [29]
3" [76mm]	3 [76]	3-3/8 [86]	1-1/8 [29]
4" [102mm]	4 [102]	4-3/8 [111]	1-1/8 [29]
5" [127mm]	4-15/16 [125]	5-5/16 [135]	1-1/2 [38]
6" [152mm]	5-15/16 [151]	6-5/16 [160]	1-1/2 [38]
8" [203mm]	6-15/16 [176]	7-5/16 [185]	1-1/2 [38]
2. PUSH-ON (P)	A	B	C
2" [51mm]	2 [51]	3-3/8 [86]	3 [76]
3" [76mm]	3 [76]	4-3/8 [111]	4 [102]
4" [102mm]	4 [102]	5-1/2 [140]	5-1/8 [130]
3. THREADED (T)	A	T	C
2" [51mm]	2 [51]	9/16 [14]	3-1/4 [83]
3" [76mm]	3 [76]	3/4 [19]	4-1/2 [114]
4" [102mm]	4 [102]	15/16 [24]	5-5/8 [143]
6" [152mm]	5-15/16 [151]	6-5/16 [160]	1-1/2 [38]
4. INSIDE CAULK (X)	A	B	C
2" [51mm]	2-5/8 [67]	3-1/16 [78]	-
3" [76mm]	3-3/4 [95]	4-3/16 [106]	-
4" [102mm]	4-3/4 [121]	5-3/16 [132]	-
6" [152mm]	5-15/16 [151]	6-5/16 [160]	1-1/2 [38]
5. PVC/ABS SOCKET (-30,-31)	A	B	C
2" [51mm]	3-3/8 [88]	2-3/8 [60]	-
3" [76mm]	3-3/8 [89]	3-3/8 [89]	-
4" [102mm]	4-3/8 [114]	4-3/8 [114]	-

MIFAB Floor Drain Selection Guide (Cont'd)

TRAPPING OF SEDIMENTS

There are few, if any, floors and areas that are free of sediments, debris and bits of non-liquid waste that will gravitate to the floor areas. Such materials, if permitted to enter drains unchecked will lead to messy stoppage of the lines. Therefore, preventive measures should be taken to ensure free drainage without stoppage. MIFAB offers a complete range of sediment buckets for all applications (see details below). In addition, the specifier should consider that all of **MIFAB's area drains are engineered with 3/8" maximum openings in the grates to prevent large matter from entering the drains, thus often rendering the sediment bucket unnecessary. Elimination of sediment buckets in area drains can increase flow by 60%** since clogged sediment buckets are infrequently cleaned. Larger openings in grates often require sediment buckets that then clog and get thrown away, exposing the drainage system to unfiltered sediments, leading to expensive drain line maintenance. Sediment buckets may be used with MIFAB's floor drains in areas such as washrooms and showers to intercept valuables and hair. Choose Suffix-5 for the specification of sediment buckets. When sediment buckets are not available, a secondary dome strainer (Suffix-20) or a secondary flat strainer (Suffix-21) may be specified.



F1320-TFB

True-fit bucket design **ensures bucket replacement after cleaning since the top grate cannot be inserted unless the bucket is in place** because the grate is set into the bucket and the bucket suspends within the top assembly. Integral with F1320-TFB, F1340-TFB and F1360-TFB area drains.



A1-PB

Stainless steel (A1-SSB-3) and plastic sediment buckets (A1-PB) are engineered to suspend from the inside ledge of floor drain strainer shanks.



F1320-TA

A1-MB

Cast iron (A1-MB) sediment buckets are engineered to suspend from the recessed, inside ledge, of the small area drain (F1300-TA, F1320-TA, F1420-TA) top assemblies. Stainless steel (A1-MB-3) sediment buckets are also available for use with nickel bronze and stainless steel top assemblies

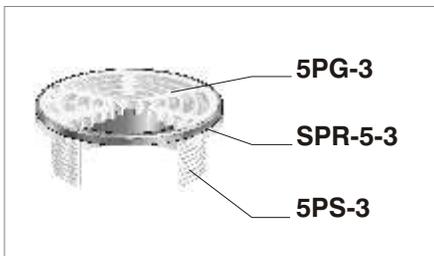


F1340-TA

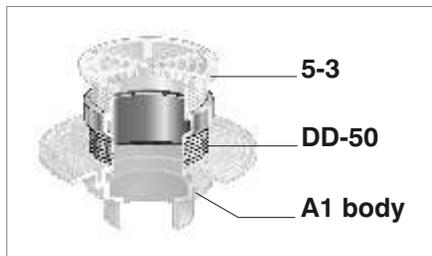
A2-MB

Cast iron (A2-MB) sediment buckets are engineered to suspend from the recessed, inside ledge, of the large area drain (F1340-TA, F1360-TA, F1440-TA, F1460-TA) top assemblies.

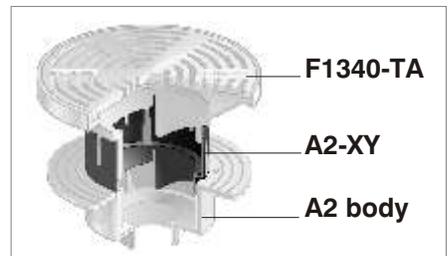
EXTENSIONS



The SPR-5-3(-1 for NB) is used with 5-1 and 5-3 strainers to increase the height of the strainer to match discrepancies in the finished floor grade. Any number of rings can be added on top of each other. Each ring adds 3/8" of height. Simply remove the grate, place the SPR-5-3(-1 for NB) into the cast in place shank, and then screw the grate into the ring. Longer bolts are provided by MIFAB. **The vertical height of the strainer can be adjusted after the drain is poured in place.**



The DD-50 extension is used with A1 and A4 bodies to receive any strainer or cleanout top with a 4" N.P.S. shank. The DD-50 has an adjustment range of 1 1/2" to 2 5/8".



The A2-XY is used with A2 and A3 bodies to receive the F1340-TA, F1360-TA, F1440-TA and F1460-TA top assemblies. It has an adjustment range of 3 7/8" to 5 3/8". **The top assembly can be adjusted side to side to align with the floor tiles without changing vertical height.** This is a benefit in promenade areas where the installer must align square tiles with the drain top assembly. The A2-XY is independent of the body and the top assembly is independent of the A2-XY.