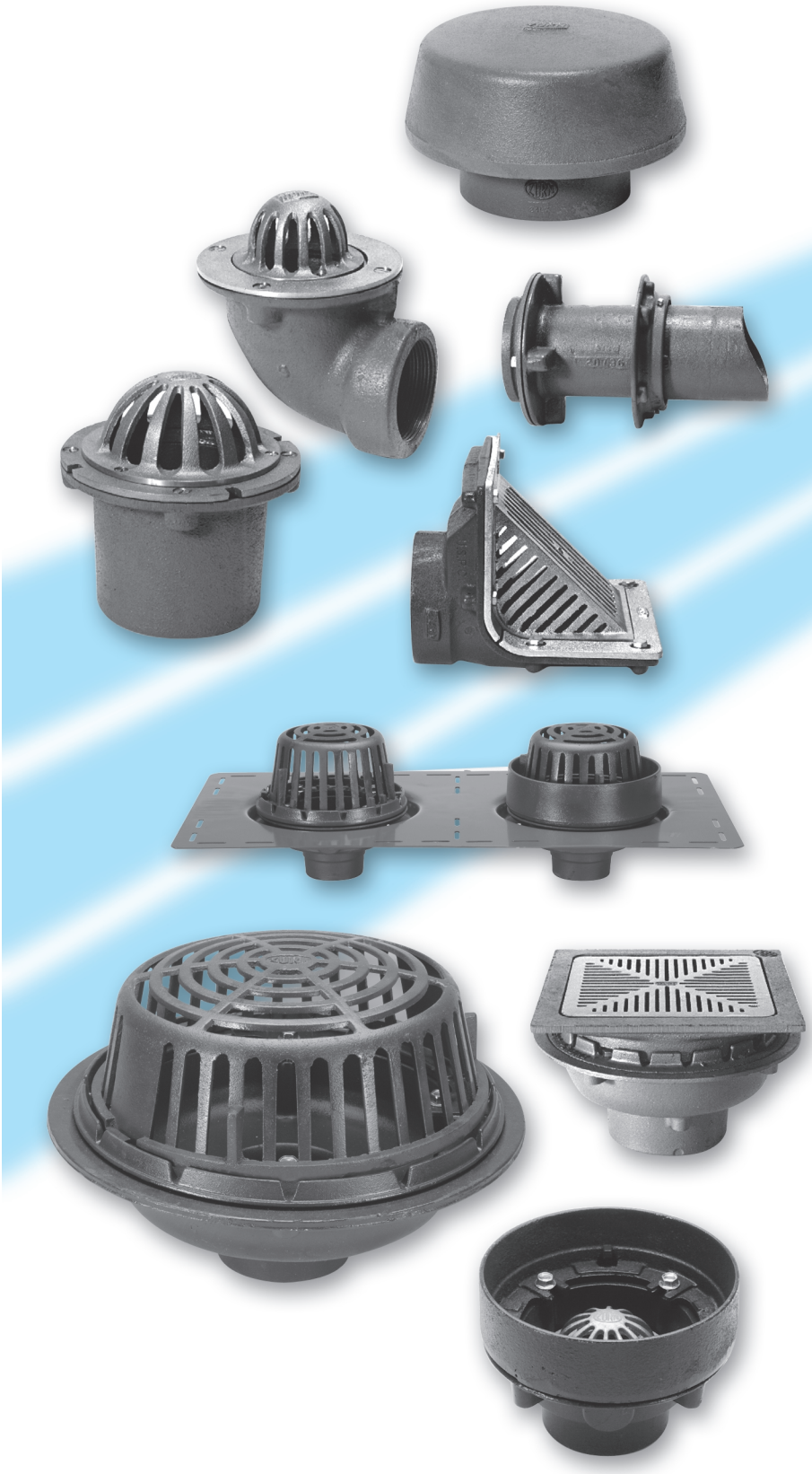
ZURN® *Specification Drainage Engineering Guide*

Roof Drains



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INTRODUCTION

All building roofs are subject to destructive effects of sun, rain, snow, seasonal weather changes, ventilation system, exhaust air, ventilation under the roof, roof loading, traffic on the roof, acid-laden smoke, and the abrasive action of dust and grit borne by high velocity winds. Alternate wetting and drying, freezing and thawing caused by water lying on the roof causes expansion, contraction, and rotting, with damage often extending even to the substructure.

While sound, comprehensive design and good materials will provide owners with trouble-free roof installation for many years, one certain means by which periods between repair and replacement can be importantly extended is through provision of more effective roof drainage systems. By the simple act of draining water from the roof, many of the major causes of roofing failure can be eliminated.

The Zurn Roof Drains and Drain Accessories represent more than 100 years of experience in supplying engineered roof drainage equipment to the construction market.

WHEN SELECTING A ROOF DRAIN

Note: First and foremost, be sure to comply with all local plumbing codes.

To select the proper roof drain, the following information must be known:

1. Type of Roof Construction
2. Roof Size
3. Roof Pitch
4. Location of Drains
5. Desired Rate of Drainage
6. Roof Load Requirement
7. Safety Load Requirement
8. Volume of Expected Rainfall
   (Consult the Inch Per Hour Rainfall map on Page 5.)

PICTORIAL INDEX

Z100
15" Diameter Main Roof Drain
Low Silhouette Dome

Z101
High Capacity 20" Diameter Main Roof Drain
Low Silhouette Dome

Z104
Deep Sump Roof Drain
Low Silhouette Dome

Z105
Control-Flo Roof Drain
with Parabolic Weir

Z107
Wide Deck Flange Roof Drain

Z108
15" Diameter Deck Receptor Drain

Z111
12" Diameter Roof Drain
For Metal Decks

Z121
12" Diameter Roof Drain
Low Silhouette Dome

Z122
12" Diameter Deck Receptor Drain

Z125
8" Diameter Roof Drain
Low Silhouette Dome

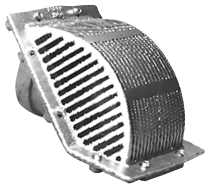
Z127
8-1/2" Diameter Deck Receptor Drain

Z150
14" Prom-Deck Drain
with Heel-Proof Grate

Z154
11" Prom-Deck Drain
with Heel-Proof Grate

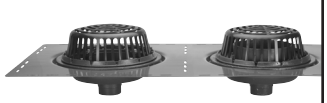
Z158
8" Prom-Deck Drain
with Heel-Proof Grate

Z160
135° Scupper Drain



Z161
3" x 10" Oblique Scupper Drain

Z163
15" Diameter Combination Main Roof and Overflow Drain



Z164
12" Diameter Combination Main Roof and Overflow Drain

Z165
8-3/8" Diameter Combination Main Roof and Overflow Drain

Z180
4" Diameter Cornice Drain
Bottom Outlet

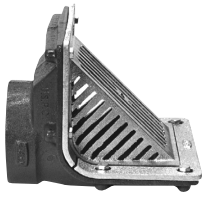
PICTORIAL INDEX

Z181
6" Diameter Cornice Drain
Bottom Outlet

Z182
4" Diameter Cornice Drain
90° Outlet

Z185
6" Diameter Cornice Drain
90° Outlet

Z187
6" x 7" or 8" x 12"
Oblique Scupper Drain



Z189
5" x 6" x 11" Scupper Drain

Z190
Vertical Expansion Joint

Z191
5" x 4" x 24" Downspout Boot

Z191-RD
4" x 18" Downspout Boot

Z192
4" x 3" Downspout Boot

Z193
Vandal-Proof Hooded Vent Cap

Z195
Vent Stack Flashing Sleeve

Z196
Vent Stack Flashing Sleeve

Z197
Riser Sleeve

Z198
Parapet Scupper Sleeve

Z199
Downspout Nozzle

Z199-DC
Downspout Cover

RD2150
Replacement Roof Drain

Available through Zurn Light Commercial

PRODUCT COMPLIANCE

Zurn Roof Drains are constructed of high quality materials and, in general, are designed to meet the requirements of ANSI Standard A112.21.2M. For verification of a selected roof drain, contact your local Zurn Sales Representative.

APPLICATION INDEX – ZURN HAS A DRAIN FOR ALL APPLICATIONS

Roof drain selection should be made with a specific type of roof construction in mind. The many types and sizes of drains offered by Zurn, coupled with a wide array of available options, provide you with a roof drain for all applications.

APPLICATION	RECOMMENDED ROOF DRAIN
Main Roof	Z100, Z100-90, Z104, Z105, Z107, Z108
High Capacity	Z101
Water Insulated Main Roof	Z100-AW, Z100-W, Z100-89
Medium Area	Z111, Z121, Z121-90, Z122
Inverted Membrane Roof Deck	Z100-85, Z100-BS, Z121-85, Z125-85
Overflow	Z108, Z122, Z127, Z163, Z164, Z165
Penthouse and Small Area	Z125, Z125-90, Z127
Promenade and Patio	Z150, Z154, Z158
Parapet Scupper	Z160, Z161, Z187, Z189
Canopy and Terrace	Z180, Z181, Z182, Z185
Expansion Joints	Z190
Downspout Boot	Z191, Z191-RD, Z192
Vent Cap	Z193
Flashing Sleeves and Scupper Sleeves	Z195, Z196, Z197, Z198
Downspout Nozzle	Z199, Z199-DC

SIZING DATA (For Conventional Drainage)

Zurn makes it easy to size roof drains. The four things you will need to know are: 1) rate of precipitation; 2) total area of roof; 3) size of leader required; and 4) area handled by each drain.

When sizing roof drains, the limiting factor for the amount of water each drain will carry away is the size of leader. Therefore, increasing leader size decreases the number of drains required.

STEP-BY-STEP SIZING OF ZURN DRAINS

Step 1: A. Calculate total roof area.
Example: Roof area is 300 x 500 ft; 300 x 500 = 150,000 sq. ft.

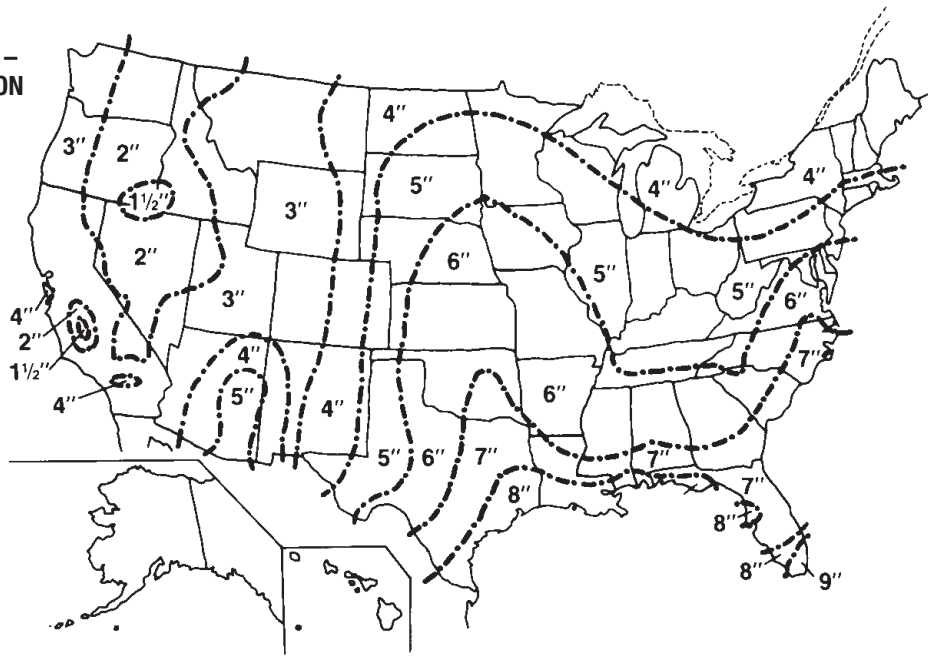
B. Determine the size of leader to be used.
Example: 4" leader size is selected.

Step 2: Locate building site on map below to find rainfall rate. **Note:** This map is taken from the National Standard Plumbing Code, Appendix A, and should only be used for general reference. Consult local codes for more precise data. **Example:** For a building located in Erie, PA, the map shows a 4" hourly rainfall.

Step 3: Cross reference leader size with hourly rainfall in chart below to obtain roof area that can be handled by each leader. **Example:** For a 4" hourly rainfall and 4" leader, each drain can handle 4,600 sq. ft. of roof area.

Step 4: Divide total roof area by area found in Step 3 to obtain the number of drains required. **Example:** 150,000 sq. ft. divided by the 4,600 sq. ft. equals 32.6, or 33 drains required. The drains should be equally spaced and located symmetrically about the roof.

STORM DRAINAGE SIZING
PRECIPITATION RATE INCHES/HOUR –
BASED ON 15-MINUTE PRECIPITATION



ROOF DRAIN VERTICAL REQUIREMENT FOR HORIZONTAL ROOF AREAS AT VARIOUS RAINFALL RATES*

Leader Size		Hourly Rainfall In Inches									
Pipe Size (Inches)	Open Area (Sq. In.)	1	1-1/2	2	2-1/2	3	4	5	6	7	8
		Total Square Footage Covered Per Drain									
2	3.14	2,880	1,920	1,440	1,150	960	720	575	480	410	360
3	7.06	8,880	5,860	4,400	3,520	2,930	2,200	1,760	1,470	1,260	1,100
4	12.56	18,400	12,700	9,200	7,360	6,130	4,600	3,680	3,070	2,630	2,300
5	19.60	34,600	23,050	17,300	13,840	11,530	8,650	6,920	5,765	4,945	4,325
6	28.30	54,000	36,000	27,000	21,600	18,000	13,500	10,800	9,000	7,715	6,750
8	50.25	116,000	77,400	58,000	46,400	38,660	29,000	23,200	19,315	16,570	14,500

*Above sizing data is offered as a guide only. For actual applications consult local codes.

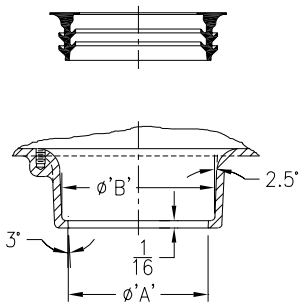
ZURN OUTLET PIPE CONNECTIONS

INSIDE CAULK (IC)

Often specified where drain body is positioned on pipe, bottom of outlet is sealed with oakum and connection is then completed according to local plumbing codes.

INSIDE GASKET (IG)

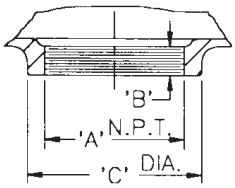
The IG connections utilize an inside caulk drain body and a Zurn "Sealtrol" gasket. **This connection is only recommended for basement or ground floor applications.**



I.C. with Sealtrol Gasket (IG)
Inside Caulk (IC)

IRON PIPE (IP)

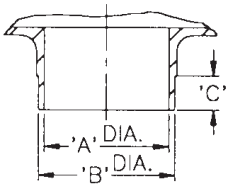
Zurn Iron Pipe Threaded connection is an old industry standard. The female (NPT) threaded outlet is often specified on industrial and institutional applications.



I.P. (Threaded/N.P.T.)

NO-HUB (NH)

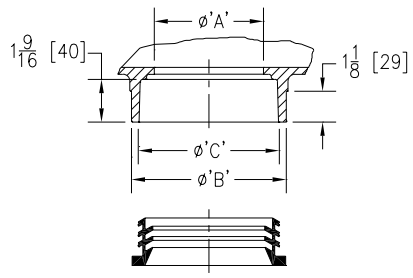
The most widely used connection. A No-Hub connection is achieved by butting No-Hub soil pipe or plastic pipe to the bottom of drain and securing it with a NH joint clamp. (Clamp furnished by others.)



No-Hub (NH)

NEO-LOC (NL)

Zurn Neo-Loc is a unique labor saving compression gasketed connection designed to simply push on the stub end of the pipe. The Neo-Loc drain body and gasket can be utilized with plastic, steel, No-Hub and service weight soil pipe. A unique pipe stop cast in each Zurn Neo-Loc drain body ensures a proper fit.



"Neo-Loc" (NL)

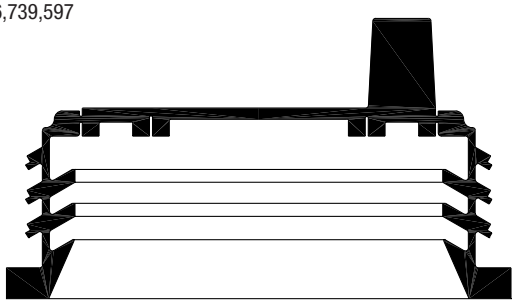
Special Note: Zurn "Neo-Loc" and "Sealtrol" gaskets are designed for use exclusively with Zurn drainage products. They are not sold separately and all warranties either expressed or implied would be forfeited if used in other than a Zurn drainage product.

OUTLETS	Dimensions in Inches [mm]		
	'A'	'B'	'C'
2" [51] No-Hub Outlet	2 [51]	2-3/8 [60]	1-1/8 [29]
3" [76] No-Hub Outlet	3 [76]	3-3/8 [86]	1-1/8 [29]
4" [102] No-Hub Outlet	4 [102]	4-3/8 [111]	1-1/8 [29]
5" [127] No-Hub Outlet	4-15/16 [126]	5-5/16 [135]	1-1/2 [38]
6" [152] No-Hub Outlet	5-15/16 [151]	6-5/16 [160]	1-1/2 [38]
8" [203] No-Hub Outlet	7-15/16 [202]	8-3/8 [213]	2 [51]
10" [254] No-Hub Outlet	10 [254]	10-9/16 [268]	2 [51]
12" [305] No-Hub Outlet	12 [305]	12-9/16 [319]	2 [51]
2" [51] Neo-Loc Outlet	2 [51]	3-3/8 [86]	3 [76]
3" [76] Neo-Loc Outlet	3 [76]	4-3/8 [111]	4 [102]
4" [102] Neo-Loc Outlet	4 [102]	5-1/2 [140]	5-1/8 [130]
2" [51] I.C. Outlet	2-5/8 [67]	3-1/16 [78]	–
3" [76] I.C. Outlet	3-3/4 [95]	4-3/16 [106]	–
4" [102] I.C. Outlet	4-3/4 [121]	5-3/16 [132]	–
5" [127] I.C. Outlet	5-3/4 [146]	6-3/16 [157]	–
6" [152] I.C. Outlet	6-3/4 [172]	7-3/16 [183]	–
8" [203] I.C. Outlet	8-7/8 [226]	9-1/2 [241]	–
2" [51] N.P.T. Outlet	2 [51]	9/16 [14]	3-1/4 [83]
3" [76] N.P.T. Outlet	3 [76]	3/4 [19]	4-1/2 [114]
4" [102] N.P.T. Outlet	4 [102]	15/16 [24]	5-5/8 [143]
5" [127] N.P.T. Outlet	5 [127]	15/16 [24]	6-11/16 [170]
6" [152] N.P.T. Outlet	6 [152]	15/16 [24]	7-3/4 [197]
8" [203] N.P.T. Outlet	8 [203]	1-1/8 [29]	9-3/8 [238]
2" [51] NL w/-TC	2 [51]	3-3/8 [86]	3 [76]
3" [76] NL w/-TC	3 [76]	4-3/8 [111]	4 [102]
4" [102] NL w/-TC	4 [102]	5-1/2 [140]	5-1/8 [130]

NEO-LOC DRAIN GASKET with INTEGRAL TEST CAP

The Zurn Neo-Loc Gasket with Integral Test Cap is a unique pipe connection designed to secure a drain fixture to the drain line. This labor-saving compression gasket is compatible with plastic, steel, no-hub, extra heavy, and service weight cast iron soil pipe. Both the Neo-Loc drain body and compression gasket are designed to simply push onto the stub end of the pipe. A pipe stop molded into each drain body ensures a proper fit.

Pat. No. 6,739,597



It is often required by plumbing codes that drain lines be tested for leakage once installation is complete. This test is typically performed by plugging all openings in the drain line system and applying a hydrostatic pressure charge of not less than 10-ft. head pressure to the lines for at least 15 minutes prior to inspection. The slightest loss of pressure in the system may indicate a possible leak.

Preparation to perform such testing can be a time-consuming and labor-intensive process. All drain fixtures must be plugged prior to line pressurization, and unplugged upon test completion. Current methods of preparation may involve the use of an inflatable test plug (Figure 1). Each plug is inserted into an opening in the drain line and inflated to block off the line. Once testing is complete, the plugs have to be deflated and removed. This whole process requires initial setup and post-test removal of the plugs, costing valuable time.

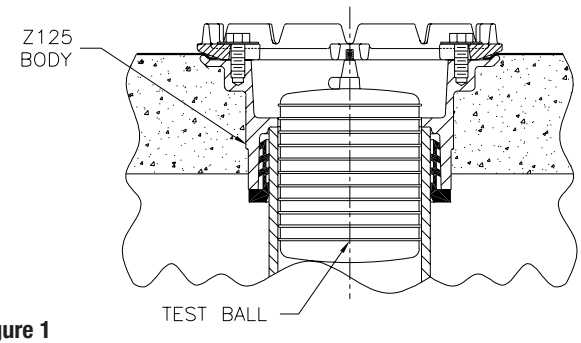


Figure 1

The Zurn Neo-Loc Gasket with Integral Test Cap eliminates the need for multiple test plugs and requires no loss of time for setup, prior to line system pressurization. The test cap is already in place when the drain body is installed, allowing for immediate testing (Figure 2). There is no need to carry multiple plugs from one drain fixture to another.

Maximum Operating Pressure - 10 psi.
Material conforms to ASTM standard C564.

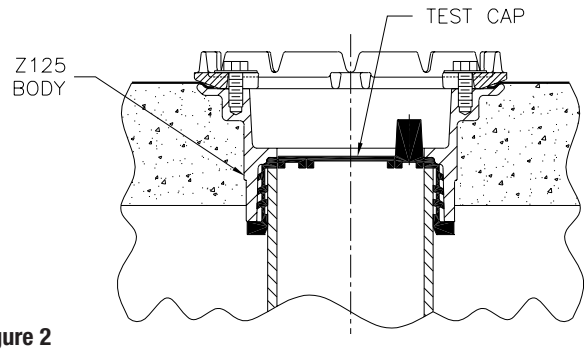


Figure 2

Benefits of Using the Neo-Loc Gasket with Integral Test Cap

- No setup time required. The test cap is already installed along with the gasketed drain body. There is no need to carry around separate test plugs and equipment from drain to drain.
- During construction and installation, dirt and debris often fall down into the drain line, creating possible blockage problems. The test cap portion of the gasket prevents this from occurring prior to line system pressurization.
- Ease of removal. The test cap portion is easily removed and discarded, leaving a clean-edged opening for water to flow through the gasket and pipe.
- Individual test plugs may become lost, damaged, and unusable after some use. The need to replace these plugs is eliminated, saving the contractor and customer money.

Installation of the Gasket

1. Make sure that the end of the drain pipe is cut square, is free of any burrs, and all sharp edges are broken.
2. Lubricate the inner and outer ribs of the gasket and the outside diameter of the pipe.
3. Fully insert the gasket into the properly sized Neo-Loc drain body.
4. Push the drain body and gasket onto the end of the drain line until the pipe comes to a secure stop.

NEO-LOC DRAIN GASKET with INTEGRAL TEST CAP, continued

Instructions for Removal of the Test Cap

Once testing of the drain line system is complete and permission has been given to open the lines, the test cap portion of the gasket can be removed by following these quick, easy steps:

1. Locate the dotted cutting line near the pull handle on the top surface of the gasket (Figure 3).
2. Using a sharp-bladed utility knife, reach down into the drain body and cut into the gasket along the dotted line. It is important to make sure that the cut is made fully through the two annular shaped rings shown in Figure 4. Failure to cut through these rings can result in tearing of the pull handle during removal of the cap.
3. Using a pair of long-handled channel lock pliers, grab the handle firmly and pull in a radial direction opposite of the cutting line (Figure 3).
4. Continue pulling the handle until the cap portion is completely severed from the body of the gasket.
5. Figure 5 shows a finished installation of the gasket after testing has been completed.

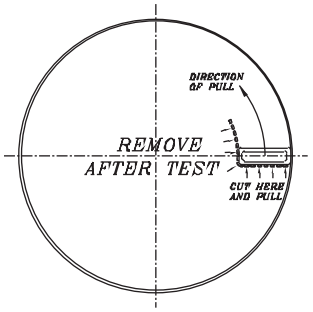


Figure 3

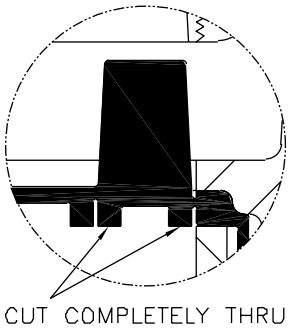


Figure 4

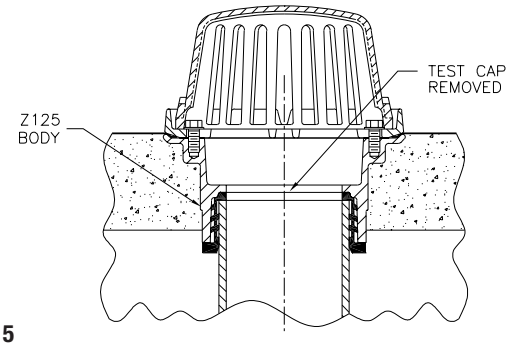
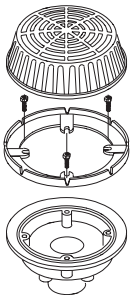


Figure 5

GENERAL PRODUCT INFORMATION

Zurn Roof Drains are comprised of three basic components: a body (sump), a combination membrane flashing clamp/gravel guard, and a dome strainer.

Two of Zurn's most popular roof drains are the Z100-C-EA-R and the Z100-DP-EA pictured below. These illustrate the basic components and several popular options: the adjustable extension (-EA), the roof sump receiver (-R), the underdeck clamp (-C), and the roof deck plate (-DP).



Dome
3/8-16 x 1-3/4 Bolt and Washer (4 Req'd.)
Flashing Clamp
Body

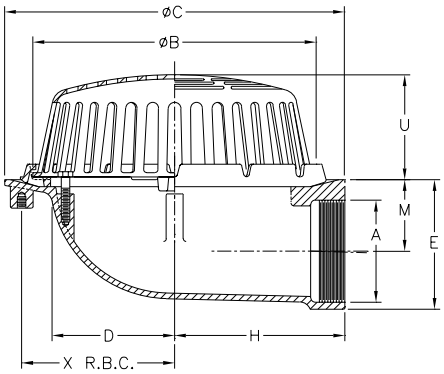
Standard Z100 Roof Drain Shown

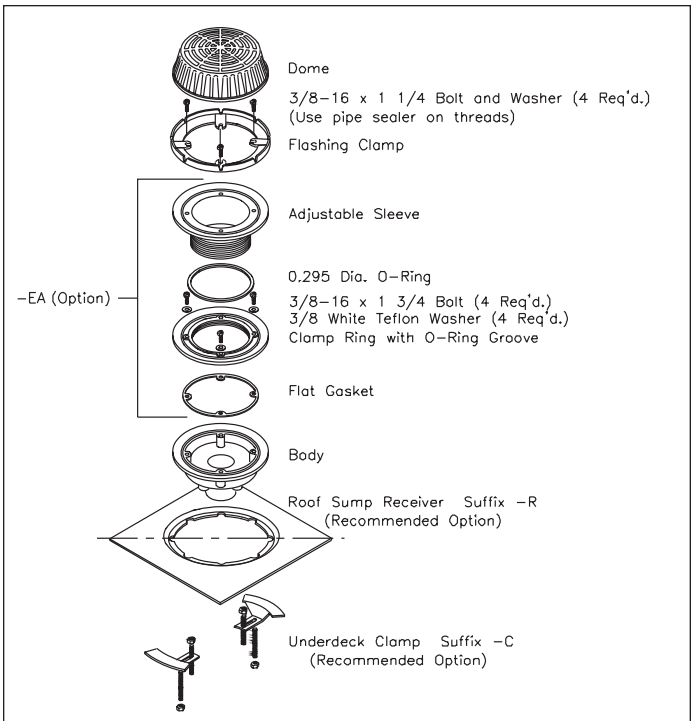
SIDE OUTLET (SUFFIX -90)

90° outlet drains are available in 8", 12" and 15" diameters. See the chart below for dimensions on each size.

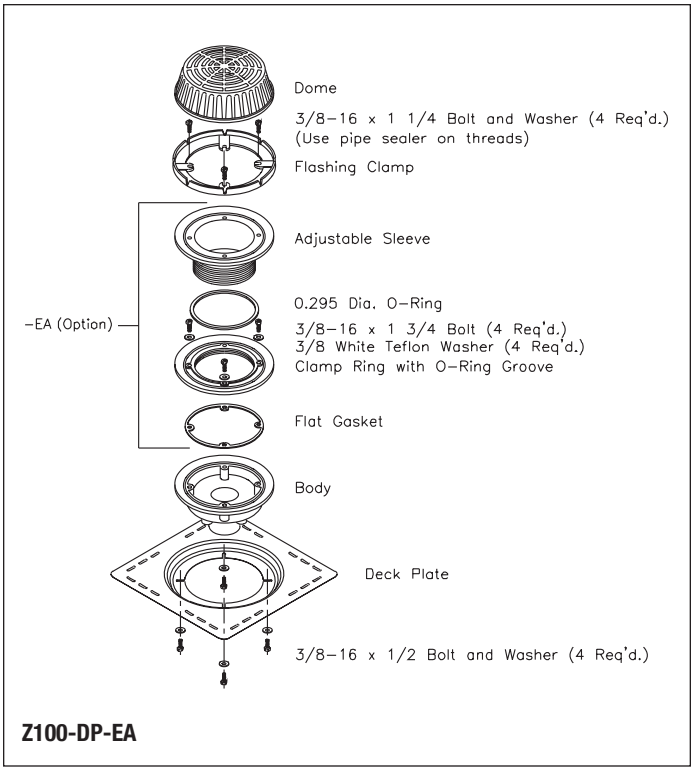
DIMENSIONAL CHART (Dimensions in Inches/[mm])

A Pipe Size	B	C	D	E	H	M	U	X
15" Diameter Drain Body								
2 [51]	12-1/2 [318]	15 [381]	5-1/2 [140]	5-3/4 [146]	7-1/2 [191]	4-1/4 [108]	4-1/2 [114]	6-3/4 [171]
3 [76]	12-1/2 [318]	15 [381]	5-1/2 [140]	5-3/4 [146]	7-1/2 [191]	3-3/4 [95]	4-1/2 [114]	6-3/4 [171]
4 [102]	12-1/2 [318]	15 [381]	5-1/2 [140]	5-3/4 [146]	7-1/2 [191]	3-1/4 [83]	4-1/2 [114]	6-3/4 [171]
5 [127]	12-1/2 [318]	15 [381]	5-7/8 [149]	7-7/8 [200]	7-1/2 [191]	4-3/4 [121]	4-1/2 [114]	6-3/4 [171]
6 [152]	12-1/2 [318]	15 [381]	5-7/8 [149]	7-7/8 [200]	7-1/2 [191]	4-1/4 [108]	4-1/2 [114]	6-3/4 [171]
12" Diameter Drain Body								
2 [51]	10 [254]	12 [305]	4-3/4 [121]	5-3/4 [146]	6 [152]	4-1/8 [105]	4-1/4 [108]	5-5/16 [135]
3 [76]	10 [254]	12 [305]	4-3/4 [121]	5-3/4 [146]	6 [152]	3-5/8 [92]	4-1/4 [108]	5-5/16 [135]
4 [102]	10 [254]	12 [305]	4-3/4 [121]	5-3/4 [146]	6 [152]	3-1/8 [79]	4-1/4 [108]	5-5/16 [135]
5 [127]	10 [254]	12 [305]	4-3/4 [121]	6-3/4 [171]	6-1/2 [165]	3-5/8 [92]	4-1/4 [108]	5-5/16 [135]
8" Diameter Drain Body								
2 [51]	7-1/2 [191]	8-1/4 [210]	3-1/2 [89]	6 [152]	5-1/4 [133]	4-1/2 [114]	4-1/4 [108]	4-1/4 [108]
3 [76]	7-1/2 [191]	8-1/4 [210]	3-1/2 [89]	6 [152]	5-1/4 [133]	4 [102]	4-1/4 [108]	4-1/4 [108]
4 [102]	7-1/2 [191]	8-1/4 [210]	3-1/2 [89]	6 [152]	5-1/4 [133]	3-3/8 [86]	4-1/4 [108]	4-1/4 [108]
5 [127]	7-1/2 [191]	8-1/4 [210]	3-1/2 [89]	6-3/4 [171]	5-1/4 [133]	3-5/8 [92]	4-1/4 [108]	4-1/4 [108]





Z100-C-EA-R



Z100-DP-EA

OPTIONS and VARIATIONS

All Zurn roof drain options are specified as a PREFIX and/or SUFFIX letter or number added to the series designation. Below are the available options. Each item in the catalog is listed with its individual prefix and suffix variation. For illustrations of certain products and options, refer to the installation drawings shown on the following pages.

PREFIXES

Z Standard Assembly or D.C.C.I. Body and Top
ZA D.C.C.I. Body with Aluminum Dome
ZB D.C.C.I. Body with Polished Bronze Top
ZC D.C.C.I. Body with Cast Iron Dome
ZN D.C.C.I. Body with Polished Nickel Bronze Top
ZAB All Bronze Body with Polished Top
ZRB D.C.C.I. Body with Plain Bronze Top
ZANB All Nickel Bronze Body with Polished Top
ZARB All Plain Bronze Body and Top
ZABN All Bronze Body with Polished Nickel Bronze Grate

SUFFIXES

-AC Angular Underdeck Clamp
Two-piece 19" square fabricated clamp with 1-1/2" raised lip. For installations where roof thickness does not accommodate standard underdeck clamp.

-AR Acid Resistant Epoxy Coated Finish

-AW 3/4" to 4" Adjustable Water Level Regulator
Made of Dura-Coated cast iron it is primarily used for storing water on the roof structure to insulate the roof.

-BS Bronze Mesh Screen Over Dome
Option used to prevent debris or gravel from entering drain. Bronze screen is securely fastened to dome.

-C Underdeck Clamp
Two-piece clamp made of Dura-Coated cast iron secures drain to deck. Stabilizes the drain and adds rigidity to the installation.

-CF Bottom Clamping Flange (See Z195)

-DA Downspout Adapter
Typically used on scupper drains, this Dura-Coated cast iron option is used as an interface between the drain and the downspout.

-DB Deep Sump Body (See Z104)

-DG Duresist Grate
Used in place of regular grate on promenade deck drains where heavier grate loading is required. Consult the General Reference Section for specifications on ductile iron.

-DP Top-Set® Roof Deck Plate
Replaces both the -C and -R.

-DR Adjustable Drain Riser Assembly
Adjustment from 3-5/8" to 7-1/4".

-DX Dex-O-Tex Flange
4" wide flange for use with applied latex. Wide flange assures water tight and permanent bond.

-E Static Extension
Non-adjustable extension used to bring drain height up to total deck thickness. Extension height must be specified.

-EA Adjustable Extension Assembly
Dura-Coated cast iron, 1-3/4" thru 3-1/2" adjustable extension which incorporates a unique O-Ring seal to ensure a watertight seal after adjustment. Can be used with static extension to obtain extension height.

-ES Static Extension with Secondary Clamp Collar at Body
For clamping at roof drain body.

-FG Flush Grate
Grate flush with contour of drain body.

-FS Flat Strainer

-G Galvanized Cast Iron

-GD Galvanized Cast Iron Dome

-HD High Dome

-R Roof Sump Receiver
Distributes weight of the drain and securely cradles drain in roof deck. (It is recommended for most Z100, Z121, and Z125 installations.)

-RD Round Inlet and Outlet

-S Secondary Strainer

-SC Secondary Clamping Collar
For use when a flashing clamp is required at the bottom of an extension. Also used to clamp additional flashing at another level.

-SS Stainless Steel Mesh Screen Over Dome
Used to prevent debris or gravel from entering drain. Screen is securely fastened to dome.

-TC Neo-Loc Test Cap Gasket
2"-4" NL bottom outlet only.

-TS Secured Top with Slotted Screws

-VP Vandal-Proof Secured Top
Exposed surface secured with vandal-proof screws.

-W2 2" Internal Water Dam
Internal water dam for insulated roof.

-W3 3" Internal Water Dam
Internal water dam for insulated roof.

-W4 4" Internal Water Dam
Internal water dam for insulated roof.

-XJ Vertical Expansion Joint
Allows for thermal expansion and contraction in the piping system. (See Z190)

-4 4" High Body (See Z180)

-8 8" High Body (See Z180 and Z181)

-10 Parabolic Weir for Sloped Roof (See Z105)

-45 45° Side Outlet Body (Threaded)

-84 4" High Type 304 Stainless Steel Perforated Gravel Guard
Stainless steel ballast guard attached to exterior of clamp collar. Prevents debris from entering drain.

-85 4" High Type 304 Stainless Steel Perforated Extension
Stainless steel ballast guard for use with inverted membrane roof system. Can be ordered in various heights to meet insulation requirements.

-89 2" High External Water Dam
Non-adjustable overflow design. Keeps debris away from the dome until overflow action begins.

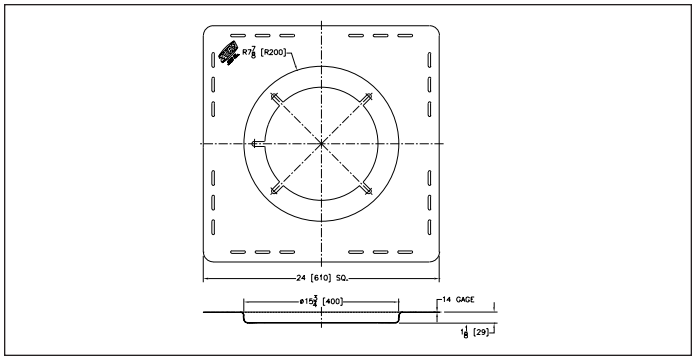
-90 90° Threaded Side Outlet Body (2" thru 6")

COMMON ROOF DRAIN ACCESSORIES

While roof applications and designs vary from one building to the next, the purpose of the drain does not. When determining the type of drain, the size of drains, and the total number of drains needed for your particular application, drain accessories are often used for installation purposes.

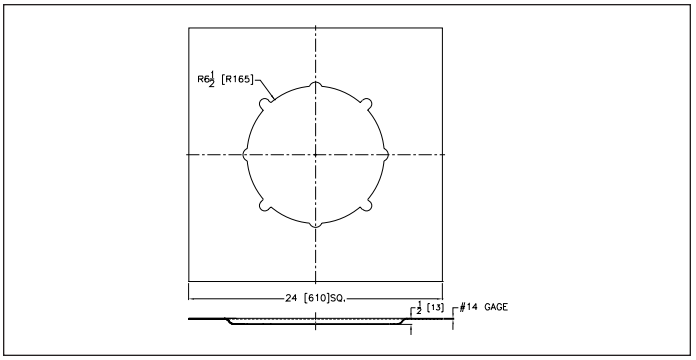
The patented Zurn Top-Set® Deck Plate (-DP) replaces the roof sump receiver (-R) and underdeck clamp (-C). The Top-Set® Deck Plate provides for a faster, more durable installation using less parts, all installed from the top of the deck.

-DP Top-Set® Deck Plate (Z100-DP Option Shown)



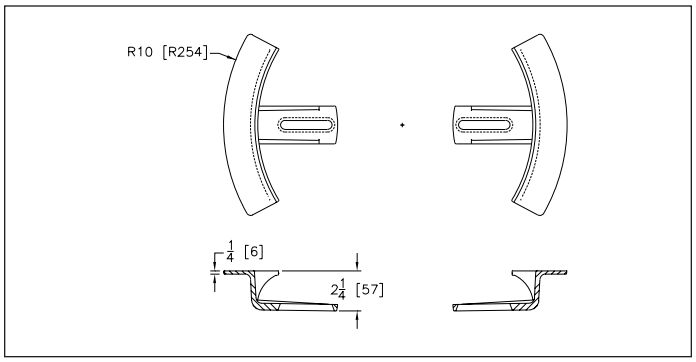
Unless the roof drain is poured directly into the concrete, the Underdeck Clamp (-C) is recommended to provide a secure, long lasting installation of the roof drain to your roof.

-R Roof Sump Receiver (Z100-R Option Shown)

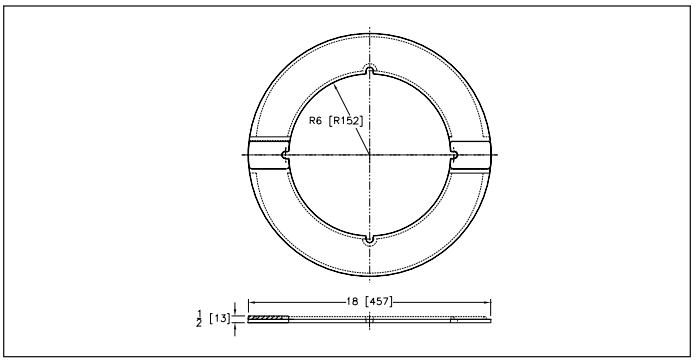


The roof sump receiver, also referred to as a bearing pan, is used when exact location of the drain can't be determined or when instances of opening the roof can not be precisely cut.

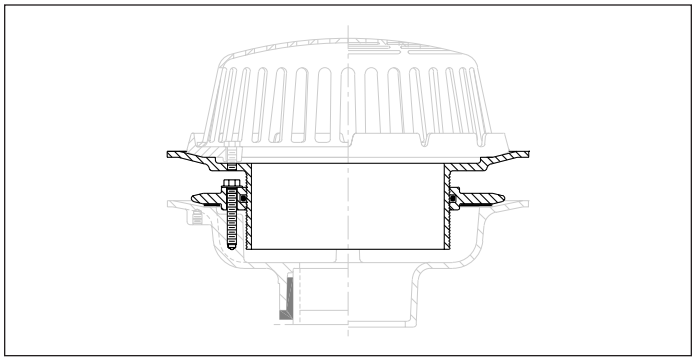
-C Underdeck Clamp (2"-5" Outlet)



-C Underdeck Clamp (6"-8" Outlet)

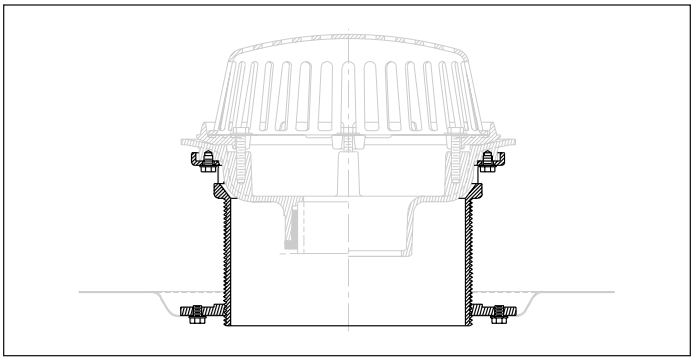


-EA Adjustable Extension Assembly



The -EA Adjustable Extension Assembly is very popular and often used when working with various degrees of roof insulation.

-DR Top-Set® Drain Riser

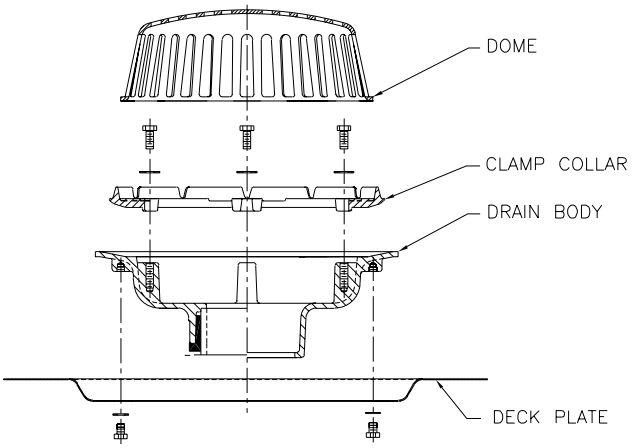


The -DR Top-Set Drain Riser Assembly is very similar to the -EA; however, the extension portion is completely removed from the path of the waterway.

TOP-SET® DECK PLATE (-DP) INSTALLATION INSTRUCTIONS

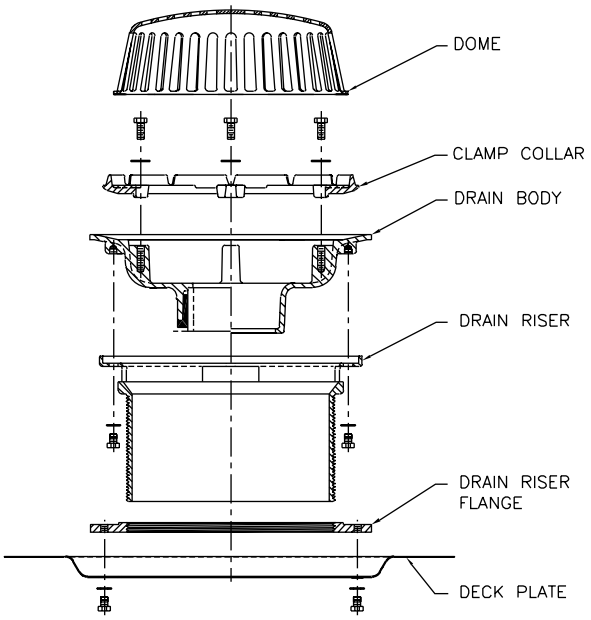
1. Create a square opening in roof (Q-deck) to receive drain assembly.
   Opening sizes are: Z100 18" x 18"
   Z121 15" x 15"
   Z125 11" x 11"
2. Fasten drain body to deck plate by aligning the four (4) bosses on body and four (4) slots on plate using bolts provided.
3. Put body/plate assembly onto the precut opening in the roof, aligning deck plate attachment slots in the appropriate position.
4. Fasten the assembly to the roof with self-tapping screws (provided by others).
5. Install insulation (if required) and secure waterproofing membrane to roof drain body with the clamp collar.
6. Attach dome to clamp collar to complete assembly.

Note: Full installation is completed from the top of the roof deck, except for pipe connection.



TOP-SET® DRAIN RISER (-DR) INSTALLATION INSTRUCTIONS

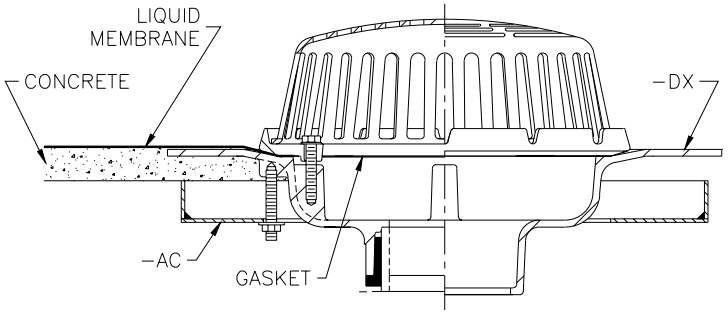
1. Create a square 18" x 18" opening in roof (Q-deck) to receive drain assembly.
2. Fasten drain riser flange to deck plate by aligning the four (4) threaded holes on the flange and four (4) slots on the deck plate using 3/8-16 x 1/2 bolts provided.
3. Thread bolts from underside of deck plate, thereby fastening the deck plate between the bolt head and flange. Flange slots may be used as an alternative with other desired hardware (not included).
4. Fasten the drain body to the drain riser sleeve by aligning the four (4) threaded holes on the body and the four (4) holes on the drain riser using 3/8-16 x 3/4 bolts provided.
5. Put deck plate/flange assembly onto the precut opening in the roof, aligning deck plate attachment slots in the appropriate position.
6. Fasten the assembly to the roof with self-tapping screws (provided by others).
7. Screw on the drain body/drain riser sleeve assembly to deck plate/ flange assembly on roof. Adjust to desired height.
8. Install insulation (if required) and secure waterproofing membrane to roof drain body with the clamp collar.
9. Attach dome to clamp collar to complete assembly.



TYPICAL INSTALLATIONS

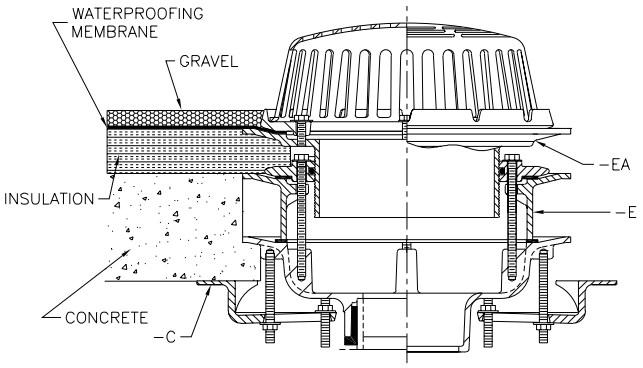
CONCRETE DECK with LIQUID MEMBRANE
Z100-AC-DX

Drain installed in a concrete deck with a mopped Dex-O-Tex finish. Drain is illustrated with angular underdeck clamp (-AC) and 20" diameter Dex-O-Tex flange (-DX). The (-AC) option is a Zurn alternate to the standard underdeck clamp which allows clearance around the drain body.



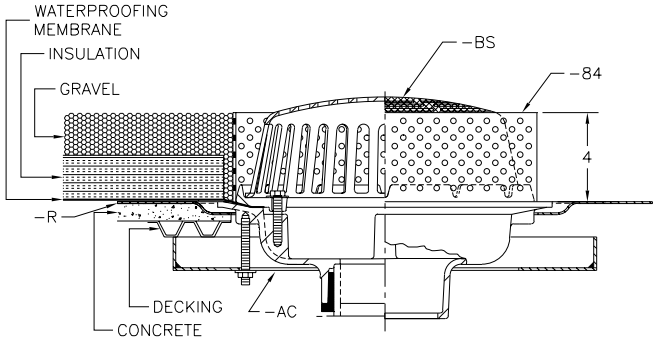
THICK CONCRETE DECK with INSULATION
Z100-C-E-EA

Drain installed in an insulated concrete deck. Drain is illustrated with underdeck clamp (-C), static extension (-E) and adjustable extension assembly (-EA). This drain allows over 2" of adjustment for varying insulation thicknesses.



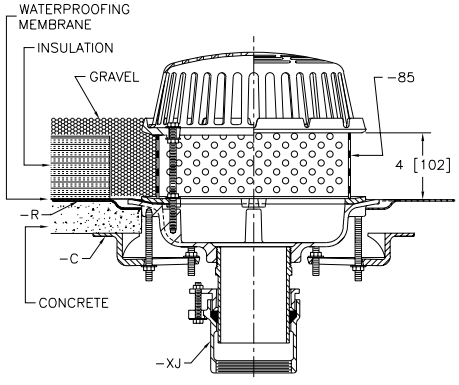
INVERTED ROOF STEEL DECK
Z100-AC-BS-R-84

Drain installed in a steel deck with insulated built-up roof. Drain is illustrated with angular underdeck clamp (-AC), bronze mesh screen over dome (-BS), roof sump receiver (-R), and gravel guard (-84).



INVERTED ROOF CONCRETE DECK
Z100-C-R-XJ-85

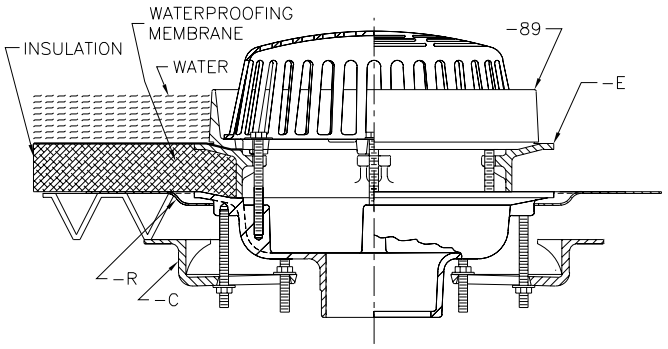
Drain installed in an insulated concrete deck. Drain is illustrated with underdeck clamp (-C), roof sump receiver (-R), vertical expansion joint (-XJ), and Zurn ballast guard extension (-85). The (-XJ) option is also available in 8" and 12" diameter drains. (See Z121 and Z125.)



TYPICAL INSTALLATIONS

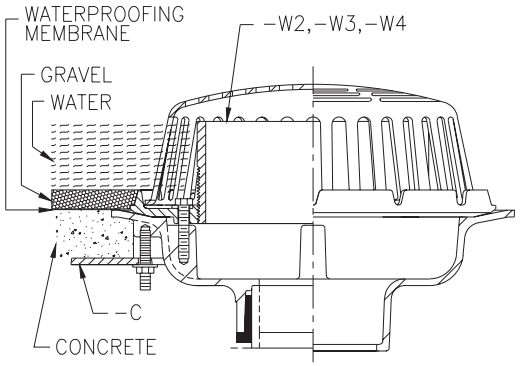
STEEL DECK WATER INSULATED and/or OVERFLOW
Z100-C-E-R-89

Drain installed in a steel deck. Drain is illustrated with underdeck clamp (-C), static extension (-E), roof sump receiver (-R), and 2" high external water dam (-89). The (-89) feature is used where a level of water is to be maintained for insulation purposes or where an overflow drain is required. The (-89) option is also available in 8" and 12" diameter drains. (See Z121 and Z125.)



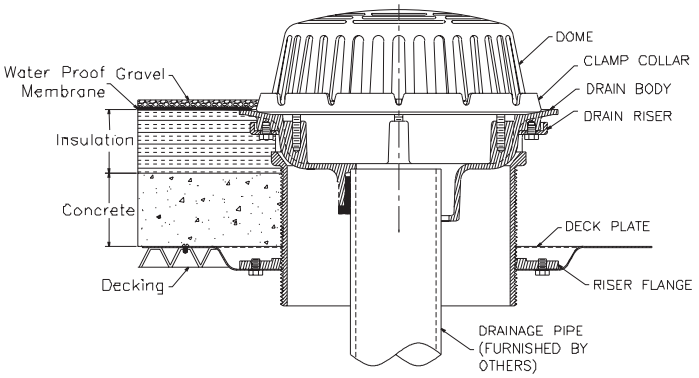
PRECAST CONCRETE DECK with OVERFLOW DRAINAGE
Z100-C-W2, -W3, or -W4

Drain installed in a precast concrete deck. Drain is illustrated with underdeck clamp (-C) and 4" internal water dam (-W4). The (-W4) option is used to maintain a 4" water level on the roof for insulation purposes or for secondary drainage. The water dam is offered in 2" (-W2), 3" (-W3), or 4" (-W4) heights to meet specific application requirements.



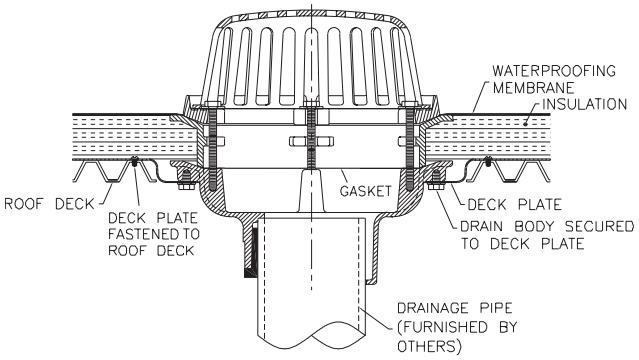
15" DIAMETER ADJUSTABLE ROOF DRAIN with DRAIN RISER
Z100-DR

Drain installed in a steel deck with insulated roof. Drain is illustrated with the Top-Set® drain riser adjustable roof extension assembly (-DR).



INSULATED STEEL DECK
Z121-DP-E

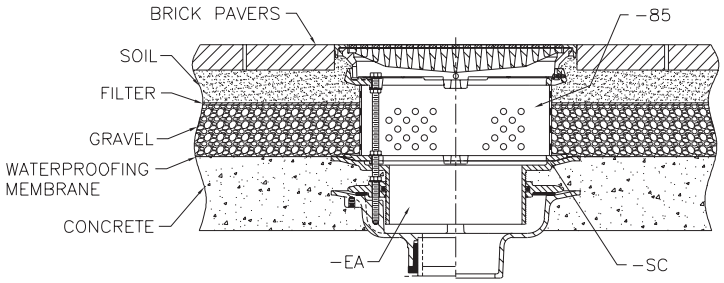
Drain installed in a steel deck. Drain is illustrated with static extension (-E) and Top-Set® roof deck plate (-DP). Deck plate replaces the need for an underdeck clamp (-C) and roof sump receiver (-R).



TYPICAL INSTALLATIONS

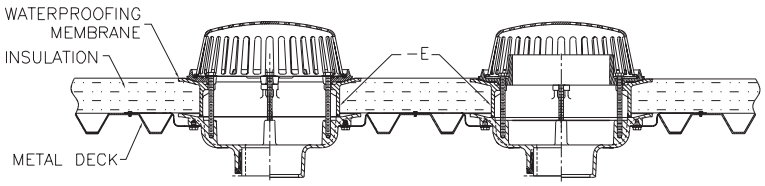
14" PROM-DECK DRAIN
Z150-EA-SC-85

Drain installed in an above-grade concrete deck. Drain is illustrated with adjustable extension (-EA), secondary clamping collar (-SC), and stainless steel ballast guard extension (-85).



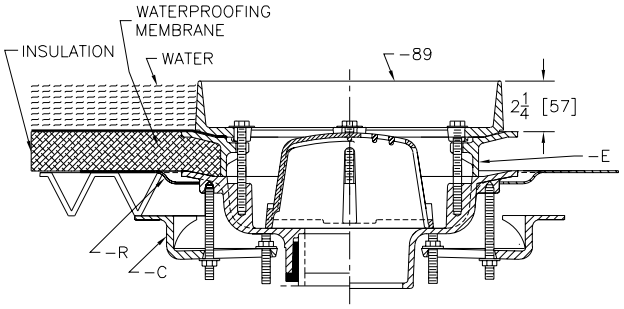
15" DIAMETER COMBINATION MAIN ROOF and OVERFLOW DRAIN
Z163-E

Drain installed in a steel deck with insulated roof. Drain is illustrated with static extension (-E) and double Top-Set® deck plate.



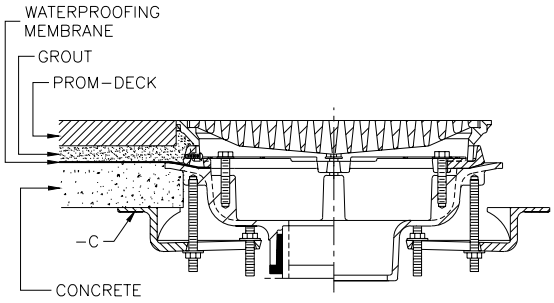
RECEPTOR DRAIN
Z108-C-E-R-89

Drain installed in a steel deck. Drain is illustrated with underdeck clamp (-C), static extension (-E), roof sump receiver (-R), and a 2" high external water dam (-89), open sump and a small bottom dome strainer. Specify where overflow or indirect waste application is required.



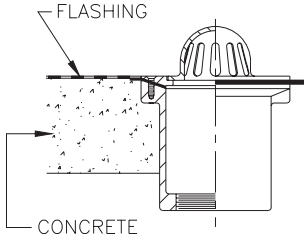
PROM DECK INSTALLED
Z150-C

Prom deck drain installed in a concrete deck. 14" square drain is illustrated with underdeck clamp (-C) and heavy-duty, heel-proof grate. Other Prom Deck drains include the 11" Z154 and 8" Z158. Both of these drains are furnished with a light-duty, heel-proof grate.



CORNICE DRAIN INSTALLED – CONCRETE DECK
Z180

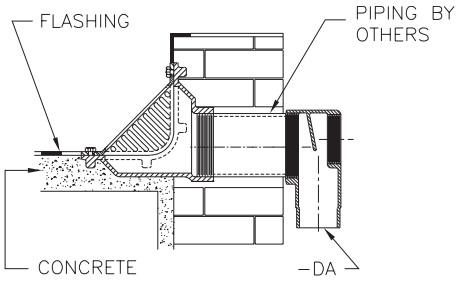
This 4" diameter cornice drain is complete with clamping collar and available with 1-1/2" or 3" high dome. For a drain with 90° outlet, see Z185.



TYPICAL INSTALLATIONS

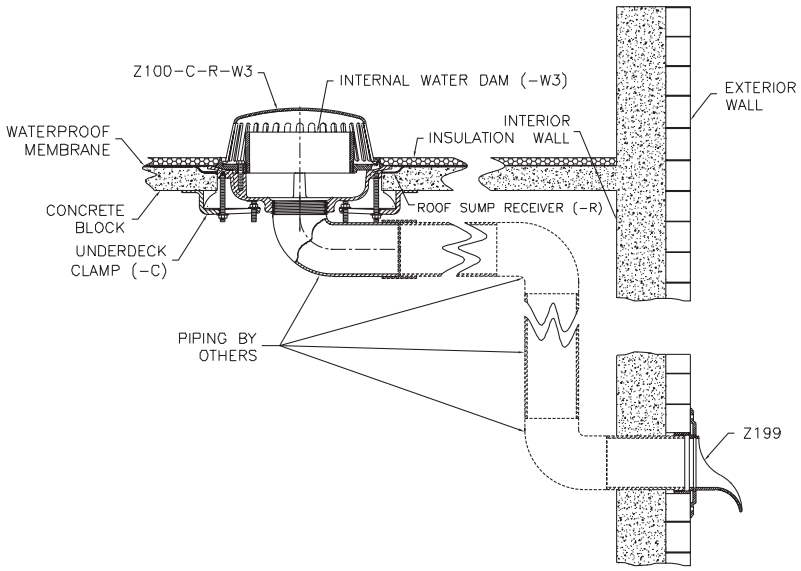
SCUPPER DRAIN INSTALLED
Z187-DA

Zurn scupper drain illustrated with regularly furnished clamping collar, oblique grate and optional downspout adapter (-DA). See Z189 for additional scupper drains.



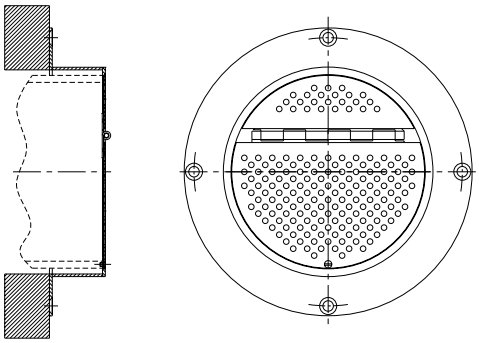
DOWNSPOUT NOZZLE
Z199

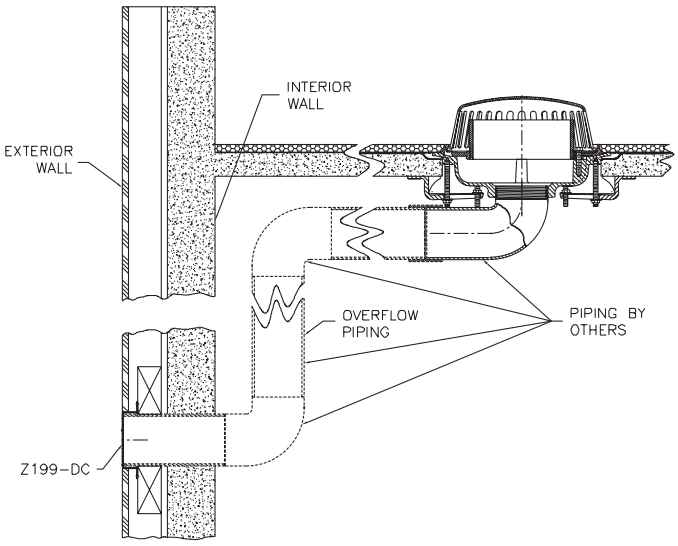
Overflow drain piping shown inside of building wall and exiting just above ground level.



DOWNSPOUT COVER
Z199-DC

Overflow drain piping shown with round stainless steel downspout cover with perforated hinged strainer installed flush with exterior wall.





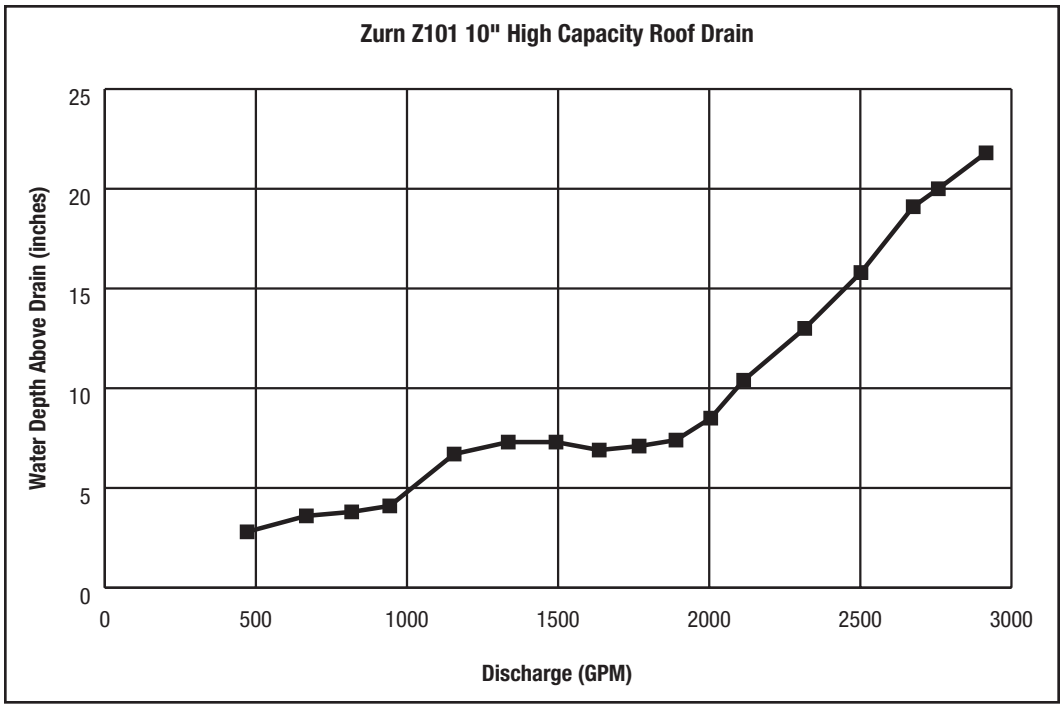
Z101 HIGH CAPACITY 20" DIAMETER MAIN ROOF DRAIN

Many regions are affected by tropical storms and other weather phenomenon making it necessary to transport large amounts of runoff water as fast and efficiently as possible. For these applications, Zurn offers the Z101 High Capacity Roof Drain. The Z101 High Capacity Roof Drain is over 30 percent larger than standard size roof drains, making it the most efficient flowing roof drain available through the market, comparing depth of head versus flow rate.

When designing roof drainage systems in regions where a large amount of water can build up on the roof in a short period of time, extra consideration should be given to roof drain location and outlet pipe diameter. The Z101 High Capacity Roof Drain is available in 8-, 10-, and 12-inch outlet sizes. It is common during severe storms for water to be blown by wind to one side of the roof area. This could create a situation that exceeds the weight limits of the roof support, resulting in a roof collapse. To avoid this situation, the Z101 High Capacity Roof Drain should be utilized and located to remove the water buildup as quickly as possible.

The Z101 High Capacity Roof Drain has been independently lab tested and designed for maximum flow effectiveness, taking into consideration the design of the drain body, outlet size, clamp collar, and dome strainer. The following table illustrates performance of the Z101 roof drain.

Discharge (GPM)	Water Depth Above Drain (Inches)
471	2.8
667	3.6
817	3.8
943	4.1
1156	6.7
1335	7.3
1493	7.3
1636	6.9
1768	7.1
1890	7.4
2005	8.5
2114	10.4
2316	13.0
2502	15.8
2675	19.1
2758	20.0
2916	21.8



Water Temperature: 40°F
Test Facility: St. Anthony Falls Laboratory
Test Date: November 17, 1997

CONTROL-FLO … Today's Answer for Areas with Restricted Storm Water Drainage Capacity

WHAT IS "CONTROL-FLO"?

Control-Flo is an advanced method of removing rain water off dead-level or sloped roofs. As contrasted with conventional drainage practices which attempt to drain off storm water as quickly as it falls on the roof's surface, Control-Flo drains the roof at a controlled rate. Excess water accumulates on the roof under controlled conditions … then drains off at a lower rate after a storm abates.

The key to economical Control-Flo drainage is the utilization of large roof areas to temporarily store the maximum amount of water without overloading average roofs or creating excessive draindown time during periods of heavy rainfall.

ADVANTAGES OF CONTROL-FLO

Cuts Drainage Costs Fewer roof drains, smaller diameter piping, smaller sewer sizes, and lower installation costs are possible with a Control-Flo drainage system because roof areas are utilized as temporary storage reservoirs.

Reduces Probability of Storm Damage Lightens load on combination sewers by reducing rate of drain water from roof tops during severe storms, thereby reducing probability of flooded sewers and consequent backflow into basements and other low areas.

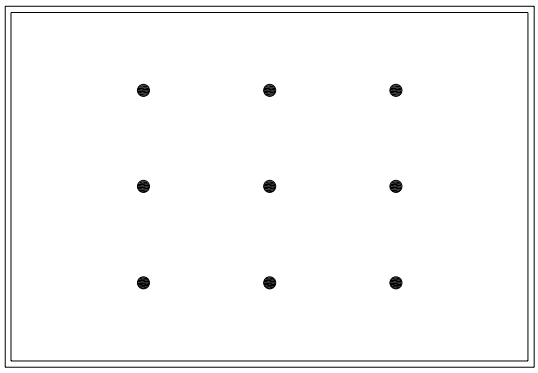
The key to successful Control-Flo drainage is a unique, scientifically designed weir containing accurately calibrated notches with sides formed by parabolic curves which provide flow rates directly proportional to the head. Shape and size of notches are based on predetermined flow rates, and all factors involved in roof drainage to assure permanent regulation of drainage flow rates for specific geographic locations and rainfall intensities.

ROOF LOADING and RUN-OFF RATES

Extensive studies show that stresses due to water load on a sloping roof for any fixed set of conditions are very nearly the same as those on a dead-level roof. A sloping roof tends to concentrate more water in the valleys and increase the water depth at this point. The greater depth around the drain leads to a faster run-off rate, particularly a faster early run-off rate. As a result, the total volume of water stored on the roof is less, and the total load on the sloping roof is less. By using the same area on the sloping roof as on the dead-level roof the increase in roof stresses due to increased water depth in the valleys is offset by the decrease in the total load due to less water stored. The net result is the maximum roof stresses are approximately the same for any single span, rise, and fixed set of conditions. A fixed set of conditions would be the same notch area, the same frequency storm, and the same locality.

DEAD-LEVEL ROOFS

A dead-level roof for purposes of applying the Zurn Control-Flo drainage principle is one which has been designed for zero slope across its entire surface.



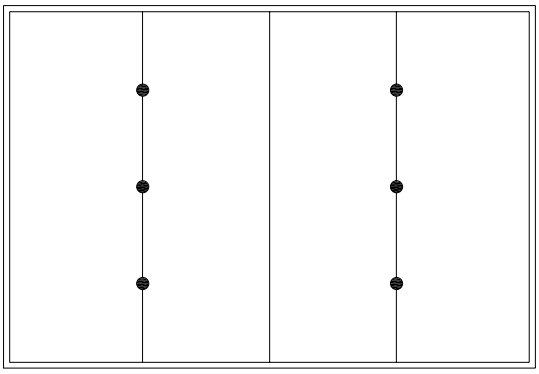
Plan View

Section View

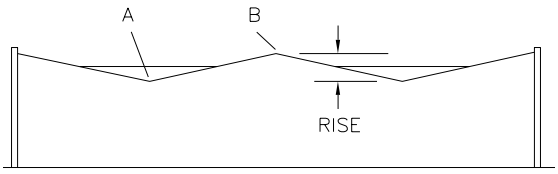
SLOPED ROOFS

A sloped roof is one designed commonly with a shallow slope. The Zurn Control-Flo drainage system can be applied to any slope which results in a total rise up to 6 inches … and data can be calculated for rises exceeding 6 inches.

The total rise of a roof as calculated for Control-Flo application is defined as the vertical increase in height in inches, from the low point or valley of a sloping roof (A) to the top of the sloping section (B). *Example:* A roof that slopes 1/8" per foot having a 24-foot span would have a rise of 24 x 1/8, or 3".



Plan View



Section View

CONTROL-FLO, continued

PROPER DRAIN LOCATION

The following good design practice is recommended for selecting the proper number of Control-Flo drains for a given area. On **dead-level roofs**, drains should be located no further than 50 feet from each edge of the roof to assure good run-off regardless of wind direction. Weir should be flush with roof surface, not recessed. On **sloping roofs**, drains should be located in the valleys at a distance no greater than 50 feet from each end of the valleys. Weir should be flush with the valley roof surface, not recessed. On **large roof areas**, drains should not be spaced at a distance greater than 200 feet.

RIGID ROOF DESIGN

Normal practice of roof design is based on 30 pounds per square foot, therefore this factor should definitely be kept in mind as a prime requirement for assuring a structurally sound roof. Otherwise, roof deflection may minimize the advantages of a well-designed roof drainage system.

Failure to recognize the adverse effects of roof deflection, even with conventional roof drainage, may lead to roof failure. With the concept of Control-Flo roof drainage, the design condition of deflection is equally important. If severe deflection is permitted, rain water will simply seek low areas, thus intensifying the degree of deflection. Thus, it is extremely important that flat roofs are designed in accordance with normal load factors so that deflection will be slight enough in any way to prevent progressive deflection which could cause water depths to load the roof beyond its design limits.

SCUPPERS and OVERFLOW DRAINS

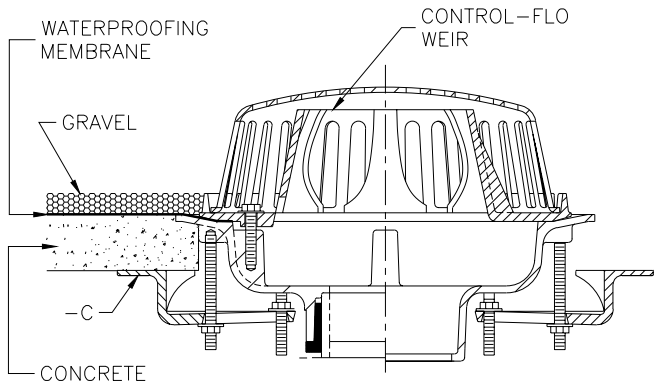
Roofing members and understructures, weakened by seepage and rot resulting from improper drainage and roof construction, can give away under the weight of rapidly accumulated water during flash storms. Thus, it is recommended, and often required by building codes, to install scuppers and overflow drains in parapet-type roofs. Properly selected and sized scuppers and overflow drains are vital to a well-engineered drainage system to prevent excessive loading, erosion, seepage, and rotting.

CONTROL-FLO INSTALLED – CONCRETE ROOF

Z105-C Control-Flo Roof Drain

The Zurn Control-Flo roof drain can be used for almost any type of roof design or installation where flow rates to the drainage system must be accurately controlled. The drain utilizes a unique weir design that limits the flow through the drain.

1) Available with 1 to 6 inverted parabolic notches.
2) Allows linear relationship between depth of water on roof and flow rate through drain.
3) Stores water on roof with controlled discharge so that drainage system and roof structural system will not be overloaded.
4) May allow use of smaller diameter piping.



(For sizing, contact Zurn Engineering Department for details.)

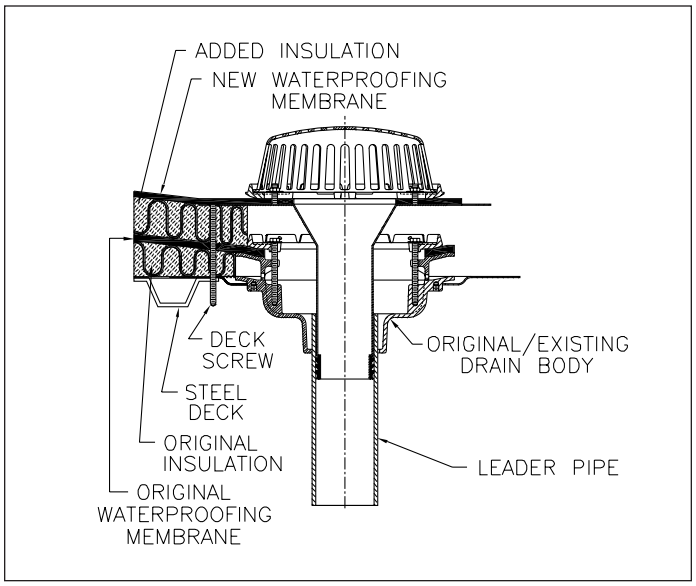
RD2150 REPLACEMENT ROOF DRAIN

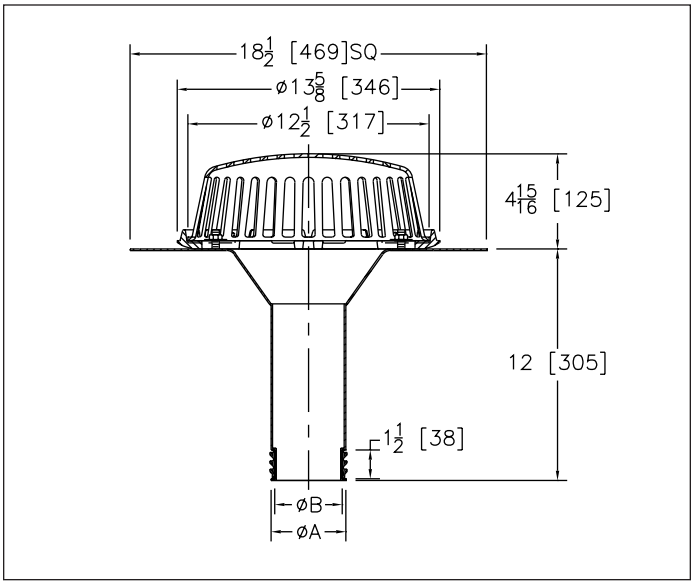
RD2150 REPLACEMENT ROOF DRAIN

The RD2150 is installed inside of an existing drain. The drain is used where re-roofing is done over existing roofing, as well as total roof replacement renovation applications. The original roof drain need not be disturbed and the new drain is installed by insertion into the leader pipe. The neoprene gasket with one-way gripping ribs holds the drain in place. Once installed, the drain is held securely in place and sealed to the pipe, preventing possible leakage. Typical installation shows new insulation and membrane applied to roof.

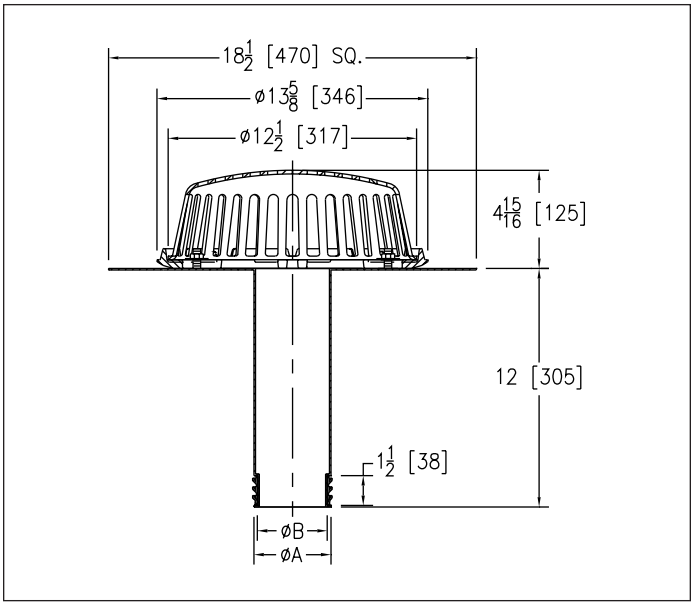
Note: Tie-down slots for fasteners are provided in the RD2150 flange. It is recommended these be utilized during construction to hold drain body firmly in place.

RD2150 TYPICAL INSTALLATION





RD2150 Replacement Roof Drain



RD2150-FS Flat Sump Replacement Roof Drain

Note: *The RD2150 and RD2150-FS are available through Zurn Light Commercial Operation.*

MATERIALS and FINISHES

Zurn Cast Iron conforms to ASTM Specification for Gray Iron Castings A 48-83, Class 25. It is produced utilizing the latest equipment and newest developed foundry techniques. Zurn cast iron castings are characterized by a high degree of strength, corrosion-resistance, workmanship, and finish.

Zurn Duresist is a ductile iron complying with ASTM Specification A 536-84, Grade 60-45-10. Its physical properties make it ideal for grates and drain components that are subjected to severe and heavy duty service. Its chemical characteristics make possible a degree of corrosion-resistance far superior to that of cast iron. Zurn Duresist exhibits remarkable stress qualities, possessing a yield strength in the same range as that of cast carbon steel, while its ability to absorb the shock loading of traffic areas is unequalled, making its use ideal for all areas where extra heavy duty service is a requirement – whether indoors or outdoors – in chemical and metal processing plants or other industrial applications.

"Zurn Dura Coat" is a specially formulated paint designed to resist cracking and chipping. Dura Coat is a latex based coating developed to be used with cast iron substrate.

Zurn Galvanized Cast Iron is a process of applying heavy zinc coating to a thoroughly cleaned iron casting. This coating contains 95% zinc. Zurn galvanizing can be supplied on all cast iron parts. It increases longevity and is recommended wherever the discoloration caused by oxidation of cast iron is objectionable. Galvanize should be used in coastal and industrial areas where corrosive atmosphere may be encountered. Zurn galvanizing meets and exceeds Federal Specification MIL-P-21035, MIL-P-26915A, MIL-P-26433, and MIL-C-10578 (Type II). It also meets ASTM A239-89 and is listed by Underwriters Laboratories, Inc. (U.L.)

Cadmium Plated Cast Iron is a process of applying a heavy cadmium coating to a thoroughly cleaned iron casting. This coating contains 95% cadmium in a cold applied process. Cadmium plating can be supplied on all cast iron parts. It increases longevity and is recommended wherever the discoloration caused by oxidation of cast iron is objectionable.

Properties of Basic Ductile Versus Cast Iron

Metal	Cast Iron	Ductile Iron
Specification	Class 25	60-45-10
Tensile Strength (PSI)	25/30,000	60/80,000
Yield Strength (PSI)	NIL	45/60,000
Elongation	NIL	10% to 25%
Modules of Elasticity	16 x 10	24 x 10

Zurn Bronze is a semi-red brass conforming to ASTM Specification for Copper Alloy Sand Casting B 584-90, Copper Alloy No. 844. The exposed surface is normally supplied possessing a satin sheen texture which allows it to blend unobtrusively with surrounding finishes. When the application requires, Zurn Bronze can be polished to a high gloss.

Zurn Nickel Bronze is a unique material that is ideally suited to traffic-bearing grates and strainers in finished floor areas. It affords the combined advantage of greater strength, better appearance, and longer service life at the same price as chrome plated brass. Superior ductility and shock resistance are the result of a copper nickel alloy (Copper Alloy 997) having a wearing surface similar in appearance to satin chrome plate; however, because it does not have a plated surface it cannot chip, peel, crack, or wear off. It is highly resistant to corrosion; however, the process of oxidation will naturally occur over time with most metals. Methods have been developed to prevent, preserve, and restore metals affected by oxidation.

Chrome Plated Bronze is ideal for installation in walls, gutters, and other areas where a bright decorative finish is desired, and is not subject to the abrasive action of foot and other traffic. It is not recommended for installations where the abrasion will eventually wear through and cause peeling. It should always be specified for swimming pool fittings due to its high resistance to the halogens (chlorine, etc.), encountered in swimming pool sanitation.

Aluminum supplied is casting grade 319. This is an alloy containing both silicon and copper. It is a solid cast metal in a pleasing light gray color. The light weight, coupled with its exceptional strength and corrosion resistance, makes it ideal for drain components such as sediment buckets and strainers. When used with acid-resisting porcelain enamel coated drains, the possibility of chipping is minimized.

Zurn Stainless Steel castings are normally produced in Type CF8 (304) which is an 18-8 Austenitic Stainless possessing excellent corrosion resistant qualities. For some applications where conditions demand, Type CF8M (316) stainless steel can be supplied. Items formed from stainless steel sheet and other stainless steel products are regularly furnished in Type 304 with 316 as an optional material.

A.R.C. Acid Resisting Epoxy Coating is a baked-on powder coating, which produces a smooth, hard, high gloss finish. This epoxy based coating offers high impact resistance and excellent life expectancy in all drainage applications. Zurn A.R.C. coating conforms to the requirements of F.D.A. (Food and Drug Administration) Regulation 21-CFR5 117.1360.

A.R.E. Acid Resisting Porcelain Enamel is a substantially vitreous or glassy inorganic coating bonded to metal by fusion at a high temperature above 800°F. This coating offers excellent acid, abrasion, and wear resistance. The coating is extremely hard and is the ultimate for sanitation in drainage applications. Zurn A.R.E. coating conforms to the requirements of F.D.A. (Food and Drug Administration) Regulation 21-CFR5 117.1360.