ZURN *Specification Drainage Engineering Guide*

Stainless Steel Drains

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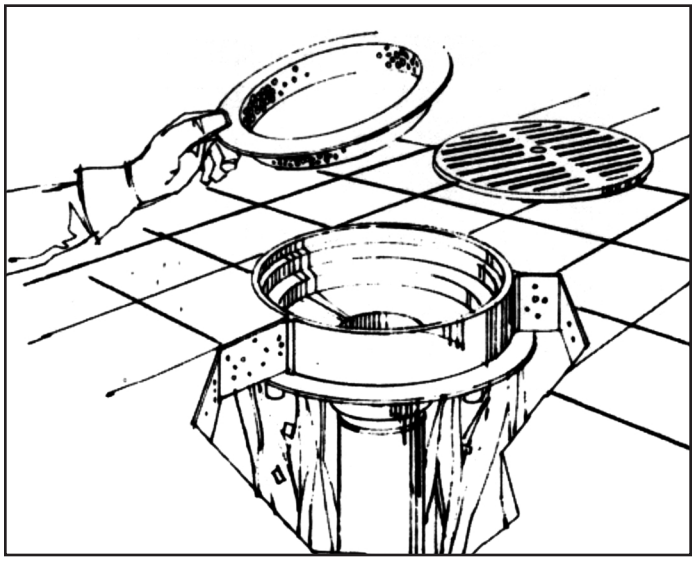
HEALTH CARE • FOOD SERVICE • POWER GENERATING STATIONS



Carbon Steel Castings

Cast carbon steel butt-weld outlet drainage products are generally applicable to fossil-fueled generating station welded steel drainage systems. However, carbon steel is also used in certain systems within a nuclear-powered station in areas not subject to radioactive wastes.

All carbon steel products as specified from this manual are manufactured and "regularly furnished" in strict accordance and certified to meet requirements as set forth in ASTM A-27-Grade 70-36 Standard Specification for "Mild to Medium Strength Carbon Steel Castings for General Application."

Any requirements other than those set forth in ASTM A-27-Grade 70-36 must be specified and known to the manufacturer prior to quotation of prices of products applicable to the project.

Stainless Steel Castings

Fabricated and cast stainless steel drainage products are preferred for healthcare and food service applications. A more sanitary and durable finish provides for years of quality performance. Type 304 (CF8) and type 316 (CF8M) are the most commonly specified types for these applications. Chemical resistant charts (page 8) should be consulted for determining the proper type of stainless steel to best meet the requirements of the application.

Cast stainless steel butt-weld outlet drainage products are generally applicable to nuclear fueled generating station welded stainless steel drainage systems. Stainless steel is employed where radioactive wastes are present but not necessarily limited to that use.

All stainless steel products specified from this manual are manufactured and "regularly furnished" in strict accordance and certified to meet requirements as set forth in ASTM A-351-Grade CF8 (type 304) Standard Specification for "Austenitic Steel Castings for High-Temperature Service."

Any requirements other than those set forth in ASTM A-351-Grade CF8 must be specified and known to the manufacturer prior to quotation of prices of products applicable to the project.

Closure Plugs

Floor drain closure plugs are required to be installed in the outlet when the drainage system is seldom used or to prevent cross ventilation or when hydrostatic testing of the piping system is required.

When closure plugs are specified for either cast carbon steel or cast stainless steel floor drains, it is recommended the plug be constructed of brass material. This is recommended to prevent gauling or "freezing" at the threaded connection. "Freezing" causes a great deal of difficulty in removing the plug and oftentimes causes destruction of the plug. Unless another material is specified, brass plugs will be furnished as standard. If cast carbon steel or cast stainless steel plugs are specified, the material will meet the specified ASTM type for castings as mentioned above. An auxiliary 3/4" plug is sometimes required within the outlet closure plug; this smaller plug will be of the same material used in construction of the primary closure plug.

Commonly specified stainless steel ASTM A-351 grades and types for "Austenitic Steel Castings for High Temperature Service" are as follows:

TABLE 1 Chemical Requirements

Element % (Max. Except Where Range is Given)	CF8.-CF8A Compatible to Type 304	CF3.-CF3A Compatible to Type 304L	CF8M Compatible to Type 316
Carbon	0.08	0.03	0.08
Manganese	1.50	1.50	1.50
Silicon	2.00	2.00	1.50
Sulfur	0.040	0.040	0.040
Phosphorus	0.040	0.040	0.040
Chromium	18.0 - 21.0	17.0 - 21.0	18.0 - 21.0
Nickel	8.0 - 11.0	8.0 - 12.0	9.0 - 12.0
Molybdenum	0.50	0.50	2.0 - 3.0
Columbium	—	—	—

TABLE 2 Tensile Requirements

	CF8	CF3	CF - 8M
Tensile strength, min. ksi (MPa)	70 (485)	70 (485)	70 (485)
Yield strength, min. ksi (MPa)	30 (205)	30 (205)	30 (205)
Elongation in 2 in. or 50 mm, min. %	35.0	35.0	30.0
Reduction of area, min. %	—	—	—

APPLICATION INDEX

Product selection should be made with a specific application and the type of construction in mind. The varied types and sizes of Zurn drainage products, together with their options, offer a drain selection for all applications.

APPLICATION	RECOMMENDED DRAINAGE PRODUCT
Main Roof Drain	Z1715
Wall or Scupper Drain	Z1717
Food Service Floor Drain	Z1719, Z1749, Z1750, Z1751, Z1752, Z1753, Z1761, Z1762, Z1763
Indirect Waste Floor Receptor	Z1720, Z1721, Z1750-1, Z1751-1, Z1752-1
Kitchen Gutter Drain	Z1723
Heavy-Duty Floor Drain	Z1730, Z1731, Z1737, Z1738
Adjustable Floor Drain	Z1726, Z1727, Z1732
Extra-Heavy-Duty Floor Drain	Z1735, Z1736
Wall of Pitt Drain	Z1739
Backwater Valve	Z1740
Sanitary Floor Cleanout	Z1745
Pool Deck Drain	Z1723

BENEFITS OF USING STAINLESS STEEL

Stainless steel is used in many everyday applications in the home, hospitals, food processing, automotive industry, farming, and many other areas. Stainless steel products are easy to maintain and are the recommended choice by most health authorities.

- **Ease of Fabrication –** Because of today's modern steel-making techniques, stainless steel castings and fabrications can be cut, formed, welded, and machined as readily as traditional steels.
- **Corrosion Resistance –** Ordinary steels will rust if not properly protected from atmospheric conditions. Because of the inherent corrosion resistance of stainless steel, its appearance and finish will have an outstanding permanency.

  Note: Cast stainless steel is subject to some surface rust and may possess magnetic properties.
- **Hygiene –** The faster and more efficient cleaning ability of stainless steel makes it an excellent choice for applications involving strict hygiene conditions, such as hospitals, kitchens, and other food production facilities. Maintenance is minimal and, in most applications, an occasional wash will restore the material's surface luster.
- **Aesthetic Appearance –** The bright, easily maintained surface of fabricated stainless steel provides a modern and attractive appearance. Stainless steel finishes are not affected by ultraviolet light and will not change color under natural climactic conditions.
- **Long Term Value –** Stainless steel is often the least expensive material option, when the total life cycle costs of the product are considered. Savings can be made by eliminating the need for regular replacement or re-coating of the material.
- **Environmentally Friendly –** Stainless steel is 100% recyclable.

OPTIONS and VARIATIONS

Steel drainage product 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.

PREFIXES

Z All Type 304 (CF8) Stainless Steel

ZC All Type A-27 Carbon Steel

ZM All Type 316 (CF8M) Stainless Steel

SUFFIXES

-C Galvanized Underdeck Clamp or Galvanized Cast Iron Clamp Collar

-D Dome Grate

-DB Dome Bottom Strainer

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

-DX Dex-O-Tex Flange

-E Extension/Extension Frame

-FG Flush Grate

-HD Extra-Heavy-Duty Grate

-HP Heel-Proof Grate

-IP Female Threaded Outlet

-J Auxiliary Inlet Connection (1-1/2" or 2")

-K Anchor Flange or Seepage Holes Only

-KC Anchor Flange with Seepage Holes and Clamp Collar or Clamp Collar with Seepage Holes

-LBT Less Bell Trap

-LSH Less Seepage Holes

-LY Less Sediment Bucket

-P 1/2" Trap Primer Connection

-R Recessing Pump Receiver

-RD5 5" Diameter Type 304 Stainless Steel Top

-RD7 7" Diameter Type 304 Stainless Steel Top

-RD8 8" Diameter Type 304 Stainless Steel Top

-RD10 10" Diameter Type 304 Stainless Steel Top

-SB Solids Retaining Baffle

-SC Solid Secured Cover

-SF Satin Finish Top

-SG Solid Gasketed Cover

-SP Stainless Steel Cleanout Plug

-SQ5 5" Square Type 304 Stainless Steel Top

-SQ8 8" Square Type 304 Stainless Steel Top

-SR 1/2" Thick Sanitary Rim at Top of Drain Body

-SV Stainless Steel Backwater Valve

-SW Bronze Spanner Wrench

-TC Neo-Loc Test Cap Gasket (2"-4" NL Bottom Outlet Only)

-TS Top Secured with Slotted Screws

-V Bronze Backwater Valve

-VP Vandal-Proof Secured Top

-Y Sediment Bucket

-YM Fabricated Mesh Bucket

-YS Suspended Sediment Bucket

-1 Less Grate

-2 1/2 Grate

-3 3/4 Grate

-4 Full Grate with 3" Square Opening

-5 Grate with 4" Diameter x 3-3/4" High Funnel

-8 Grate with 9" Diameter x 3-1/2" x 3-3/4" High Funnel

-12 Depressed Grate

-15 Solid Cover

-16 1/2 Solid Cover

-17 3/4 Solid Cover

-18 Solid Cover with 3" Square Center Opening

-19 Full Hinged Grate

-20 Full Hinged Cover

-30 Bronze Closure Plug

-31 Plastic Closure Plug

-33 Type 304 Stainless Steel Closure Plug

-34 Bronze Closure Plug with 3/4" Test Plug

-90 90° Side Outlet

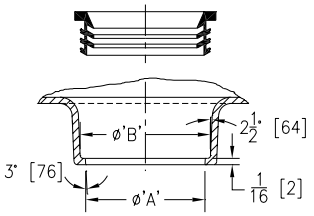
ZURN OUTLET PIPE CONNECTIONS

INSIDE CAULK (IC)

Often specified where drain body is positioned on pipe, bottom of outlet is sealed with oakum and connection is then completed with melted lead.

INSIDE GASKET (IG)

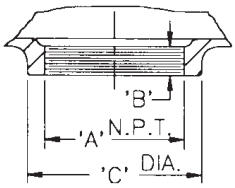
The IG connections utilize an inside caulk drain body and a Zurn "Sealtrol" gasket. **This connection is only recommended for basement or ground floor applications.**



I.C. W/SEALTROL GASKET (IG)
INSIDE CAULK (IC)

IRON PIPE (IP)

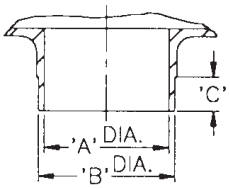
Zurn Iron Pipe Threaded connection is an old industry standard. The female (NPT) threaded outlet is often specified on industrial and institutional applications.



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

NO-HUB (NH)

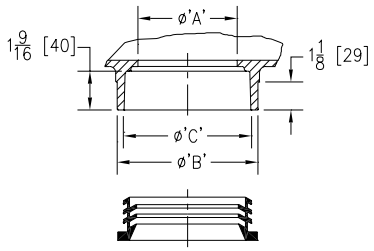
The most widely used connection. A No-Hub connection is achieved by butting No-Hub soil pipe or plastic pipe to the bottom of drain and securing it with a NH joint clamp. (Clamp furnished by others.)



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]

BUTT-WELD ENGINEERING DATA

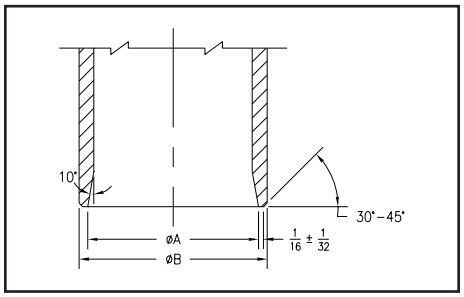
Butt-Welding Casting Outlets

The outlet sections of all cast carbon steel or cast stainless steel products as specified from this brochure shall conform to ANSI-B36.10M-85 and ANSI-B36.19M-85 standards for pipe wall thicknesses for Schedule 10, Schedule 40, or Schedule 80 as specified.

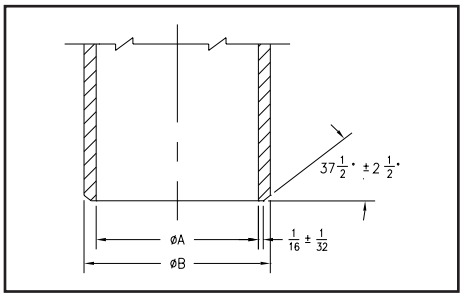
Butt-welding ends of the above mentioned sections shall conform to ANSI B16.25-86 standard for plain welding bevel of 37-1/2° + 2-1/2° and root face (land) of 1/16" + 1/32".

All outlet requirements must be specified and made known to the manufacturer prior to quotation of prices of products applicable to the project.

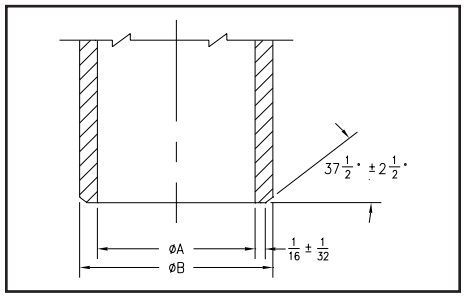
Schedule 10S Pipe



Schedule 40 Pipe

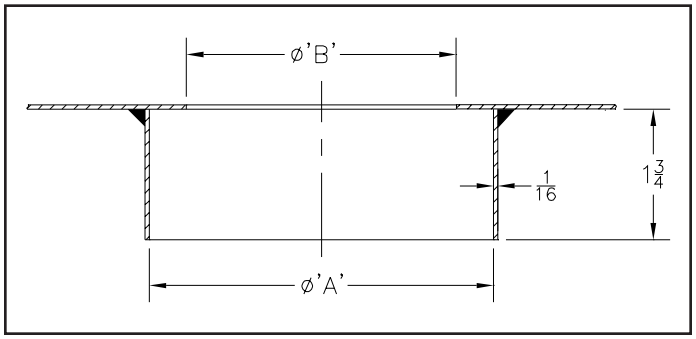


Schedule 80 Pipe

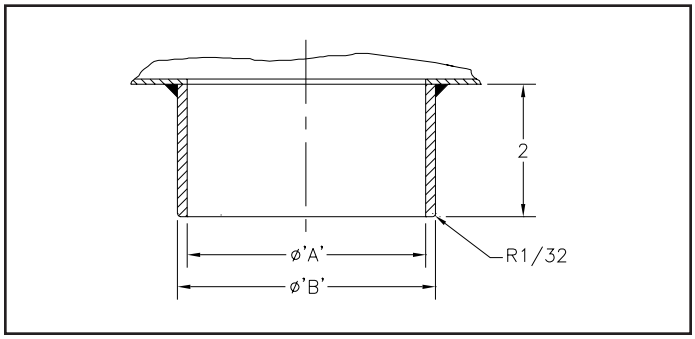


Schedule Pipe	Dimensions in Inches									
	Pipe Size									
	2		3		4		6		8	
	A	B	A	B	A	B	A	B	A	B
10S	2.157	2.375	3.260	3.500	4.260	4.500	6.375	6.625	8.329	8.625
40	2.067	2.375	3.068	3.500	4.026	4.500	6.065	6.625	7.981	8.625
80	1.939	2.375	2.900	3.500	3.826	4.500	5.761	6.625	7.625	8.625

FABRICATED STAINLESS STEEL OUTLET DATA



Neo-Loc



No-Hub

Pipe Size	Dimensions in Inches			
	Neo-Loc		No-Hub	
	A	B	A	B
2	3.010	2	2	2.31
3	4.080	3	3	3.31
4	5.102	4	4	4.38

CHEMICAL RESISTANCE CHART

TYPICAL CORROSION RESISTANCE OF STAINLESS STEEL TO VARIOUS MEDIA

CODE: a – Unaffected. b – Slightly attacked. c – Attacked. m – Complete details concerning the conditions of service must be evaluated.

MEDIUM	TYPE CF8 304	NUMBERS CF8M 316
ORGANIC SUBSTANCES		
Acetone	a	a
Benzol	a	a
Carbon tetrachloride	c	c
Ethyl alcohol	a	a
Ethyl chloride	a	a
Ethyl ether	a	a
Food pastes	a	a
Fruit juices	a	a
Ink	m	m
Mustard	b	a
Paregoric cmpd	a	a
Quinine bisulfate	b	a
Quinine sulfate	a	a
Vinegar at 70°F	m	m
ACIDS		
Acetic	m	m
Benzoic	a	a
Boric	a	a
Carbolic	a	a
Chromic (50%)	c	c
Citric	a	a
Formic	c	m
Hydrobromic	c	c
Hydrocyanic	a	a
Hydrochloric	c	c
Hydrofluoric	c	c
Lactic	a	a
Nitric (conc.)	a	a
Nitric (conc. plus 2% HCl)	a	–
Nitrous (conc.)	a	a
Oxalic	m	m
Phosphoric	a	a
Phosphoric (10%)	a	a
Picric (conc.)	a	a
Pyrogallic (conc.)	a	a
Pyroligneus (conc.)	a	a
Stearic (conc.)	a	a
Succinic (molten)	c	–
Sulfuric (conc.)	a	a
Sulfuric (dil.)	m	m
Sulfuric 15% (plus 2% potassium dichromate)	a	a
Sulfurous (conc.)	b	a
Tannic (conc.)	a	a
Tartaric (conc.)	a	a
ACIDS (Continued)		
Trichloracetic acid (10%)	a	a
Uric (conc.)	a	a
SALTS		
Aluminum chloride	c	c
Aluminum fluoride	c	b
Aluminum sulfate	a	a
Ammonium alum	a	a
Ammonium bromide	c	a
Ammonium chloride	b	a
Ammonium hydroxide	a	a
Ammonium nitrate	a	a
Ammonium sulfate	a	a
Barium chloride	a	a
Bleaching powder	c	a
Calcium chloride	c	a
Calcium hydroxide or oxide	a	a
Copper chloride	c	c
Copper cyanide	a	a
Copper nitrate	a	a
Copper sulfate (plus 2% sulfuric acid)	a	a
Copper sulfate	a	a
Creosote	c	a
Creosote (plus 3% salt)	c	c
Hydrogen peroxide	b	a
Magnesium carbonate	a	a
Magnesium chloride	m	m
Magnesium sulfate	a	a
Magnesium hydroxide	a	a
Magnesium nitrate	a	a
Phosphorous trichloride	a	a
Potassium bromide	a	a
Potassium carbonate	a	a
Potassium chloride	m	m
Potassium chlorate	a	a
Potassium cyanide	a	a
Potassium dichromate	a	a
Potassium ferricyanide	a	a
Potassium ferricyanide (boiling)	a	a
Potassium hypochlorite	c	m
Potassium iodide	a	a
Potassium iodide (sat. plus 0.1% sodium carbonate evaporated to dryness)	a	a
SALTS (Continued)		
Potassium hydrate	a	a
Potassium nitrate	a	a
Potassium oxalate	a	a
Potassium permanganate	a	a
Potassium sulfate	a	a
Silver nitrate	a	a
Silver cyanide	a	a
Sodium bicarbonate	a	a
Sodium borate	a	a
Sodium bromide	a	a
Sodium chloride (2% aerated)	a	a
Sodium citrate	a	a
Sodium fluoride	b	–
Sodium hydroxide	a	a
Sodium nitrate	a	a
Sodium peroxide (212°F)	a	a
Stannic chloride	c	c
Stannous chloride	b	–
Sulfur (molten) 500°F	a	a
Sulfur chloride	b	–
Titanium tetrachloride	a	a
Zinc chloride	c	b
Zinc sulfate	a	a
MISCELLANEOUS		
Ammonia	a	a
Baking oven gases	a	a
Bromine	c	c
Carbonated beverages	a	a
Chlorine (wet and dry)	c	c
Glycerin	a	a
Hydrogen sulfide (400°F)	b	a
Iodine	c	a
Lead (molten)	c	c
Lysol	m	m
Mercury	a	a
Sauerkraut brine	c	a
Sea water	m	m
Sulfur dioxide	b	b
Vegetable juices	a	a
X-ray developing solution	b	a
Zinc (molten)	c	c

MATERIALS and FINISHES

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.)

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.

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.

Zurn Type 304 (CF8) Stainless Steel products are manufactured and regularly furnished in accordance to the requirements set forth in ASTM A-351-Grade CF8 (type 304) standard specification for austenitic steel castings for high-temperature service. Unless otherwise specified, all products will be furnished with either plain finish or polished satin finish, as specified.

Zurn Type A-27 Carbon Steel products are manufactured and regularly furnished in accordance to the requirements set forth in ASTM A-27-Grade 70-36 specification for mild to medium strength carbon steel castings for general application. Unless otherwise specified, all carbon steel products will be furnished with a plain finish.

Zurn Type 316 (CF8M) Stainless Steel products are manufactured and regularly furnished in accordance to the requirements set forth in ASTM A-316-Grade CF8M (type 316) standard specification for austenitic steel castings for high-temperature service. Unless otherwise specified, all products will be furnished with either plain finish or polished satin finish, as specified.

Zurn Plain Finish consists of processed wheelabrated cleaning of casting to remove flash and debris. Plain Finish is recommended for industrial applications where sanitation and finish is not important.

Zurn Satin Finish consists of a wheelabrated cleaning of the casting and a polishing process that results in a granular appearance. Satin Finish is the most common finish found on stainless steel and is widely used in commercial and food service applications.