



Complete Specifications

Laboratory Service Fixtures and Safety Equipment

General A. All laboratory service fixtures shall have the construction and shall meet the performance requirements set forth in this specification. Fixture types shall be as indicated in the fixture schedule or fixture details included in either the project drawings or these specifications.

B. Laboratory service fixtures shall be [furnished, delivered to point of use and installed by the laboratory casework contractor under this Division of the specifications, for connection and plumbing by the mechanical contractor under Division 15 of the specifications] [furnished and delivered to point of use by the laboratory casework contractor, for installation, connection and plumbing by the mechanical contractor under Division 15 of the specifications.]*

C. All laboratory service fixtures and safety equipment shall be the product of one service fixture manufacturer to assure uniform appearance and ease of maintenance of the laboratory facility. Remote control valves and fittings furnished with fume hoods shall be the product of the same fixture manufacturer.

D. All service fixtures shall be factory assembled (including the assembly of valves and shanks to turrets, flanges and other mounting accessories), and each fixture shall be individually factory tested. Fixtures shall be tested in the manner and at the pressures set forth below.

E. Except as otherwise indicated, faucet and valve handles shall be forged brass four-arm type and shall have a color coded screw-on index disc. Color code requirements for indexing service fixtures shall be as follows:

Service	Index Color
Gas	Blue
Air	Orange
Vacuum	Yellow
Steam	Black
Cold Water	Green
Hot Water	Red
Deionized Water	White
Other Services	On Application

F. All laboratory service fixtures and safety equipment shall be manufactured by Water Saver Faucet Co.

II. Finish

A. General

1. Laboratory service fixtures (except fittings inside fume hoods) and safety equipment shall have the following finish:

[Polished Chrome Finish with Clear Epoxy Coating: Fixtures (except fittings inside fume hoods) have a polished chrome plated finish with clear epoxy coating. All exposed surfaces shall be polished and buffed, then electroplated with one layer of nickel and one layer of chrome. Each layer of plating shall completely cover all visible areas. Following plating, surfaces to be coated shall be thoroughly cleaned and degreased. Clear epoxy coating shall then be applied to all exposed surfaces and fully baked to permit curing. Surfaces shall have a minimum coating thickness of 2 mils.]*

[Satin Chrome Finish with Clear Epoxy Coating: Fixtures (except fittings inside fume hoods) shall have a satin chrome plated finish with clear epoxy coating. All components shall be polished and electroplated with one layer of nickel. Exposed surfaces shall then be further polished to an AISI No. 6 brushed finish which is fine-grained and uniform. Components shall then be electroplated with one layer of chrome. Following chrome plating, surfaces to be coated shall be cleaned and degreased. Clear epoxy coating shall then be applied to all exposed surfaces and fully baked to permit curing. Surfaces shall have a minimum coating thickness of 2 mils.]*

2. Fittings inside fume hoods shall have an epoxy finish color-coded to match the fixture service index color. Coating material shall be free flowing epoxy powder with a particle size of 35-70 microns. Surfaces to be coated shall be (a) polished or sandblasted to produce a uniform fine-grained surface and (b) immersed in a phosphoric acid cleaning solution to remove thoroughly all oil, grease and other foreign substances. Following cleaning, coating material shall be electrostatically applied to all exposed surfaces. After application, coating shall be fully baked to permit curing. Surfaces shall have a minimum coating thickness of 2 mils.

B. Performance Requirements

1. **Chemical Resistance.** All coating materials shall meet the following tests for chemical resistance:

(a) **Fume Test.** Suspend coated samples in a container at least 6 cubic foot capacity, approximately 12" above open beakers, each containing 100 cc of 70% nitric acid, 94% sulfuric acid and 35% hydrochloric acid, respectively. After exposure to these fumes for 150 hours, the finish on the samples shall show no discoloration, disintegration or other defects.

(b) **Direct Application Test.** Subject coated samples to the direct action of the reagents and solvents listed below at a temperature of 25 degrees C dropping from a burette at the rate of 60 drops per minutes for ten minutes. Finish on the samples shall not rupture, though slight discoloration or temporary softening is permissible.

Acetic Acid (98%)	Lactic Acid (10%)
Acetone	Methanol
Ammonium Hydroxide (28%)	Methyl Alcohol
Amyl Acetate	Methyl Ethyl Ketone
Amyl Alcohol	Methylene Chloride
Benzene	Mineral Oil
Butyl Alcohol	Monochlor Benzene
Calcium Hypochlorite	N-Hexane
Carbon Disulfide	Naphthalene
Carbon Tetrachloride	Nitric Acid (70%)
Chloroform	Perchloric Acid (70%)
Chromic Trioxide Acid	Phenol
Cresol	Phosphoric Acid (75%)
Crude Oil	Sea Water
Dioxane	Silver Nitrate (30%)
Distilled Water	Sodium Bichromate (Saturated)
Ether	Sodium Carbonate (10%)
Ethyl Acetate	Sodium Chloride (20%)
Ethyl Alcohol	Sodium Hydroxide (50%)
Ethyl Ether	Sodium Hypochlorite
Formaldehyde (37%)	Sodium Sulfide
Formic Acid (90%)	Sulfuric Acid (87%)
Gasoline	Toluene
Glacial Acetic Acid (99.5%)	Trichlorethylene
Glycerin	Turpentine
Hydrochloric Acid (38%)	Urea (Saturated)
Hydrofluoric Acid (48%)	Xylem
Hydrogen Peroxide (5%)	Zinc Chloride(Saturated)
Isopropyl Alcohol	
Kerosene	

2. Mar and Abrasion Resistance

Coating material shall have a pencil hardness of 2H-4H with adhesion substantial enough to withstand both direct and reverse impacts of 160 inch pounds. Coating shall have excellent mar resistance and be capable of withstanding scuffing, marring and other ordinary wear.

3. Reparability

Coating material shall be capable of surface repair in the event that a fixture is scratched or a surface rupture occurs. The service fixture manufacturer shall have available an air-drying aerosol coating, specially formulated to match the existing epoxy coating color, which may be applied in the field to repair coated surfaces.

III. Water Faucets and Valves

A. All faucets and valves for water service shall have a renewable unit containing all working components subject to wear, including a stainless steel replaceable seat and an integral adjustable volume control (designated by the suffix "AC"). The renewable unit shall be interchangeable among all faucets and valves for water service. The renewable unit shall be broached for position locking in the valve body. The unit shall have a high durometer thermoplastic valve disc and a molded TFE stem packing. The unit shall be capable of being readily converted from compression to self-closing, and vice versa, without disturbing the faucet body.

B. Goosenecks shall have a separate outlet coupling with a 3/8" IPS female thread securely brazed to the gooseneck for attachment of serrated hose ends, aspirators and other outlet fittings. Rigid goosenecks shall have a 3/8" IPS male inlet thread and be threaded directly into the faucet body so as to be absolutely rigid. Swing goosenecks shall utilize a TFE packing with an externally adjustable packing nut.

C. Vacuum breakers, where required and indicated by the fixture number, shall be integral with the gooseneck. Vacuum breakers shall have a forged brass body, a renewable seat and an ultralight float cup with a silicone gasket for fine flow control. Vacuum breakers shall not spill over at low water volume. Vacuum breakers shall be certified by the American Society of Sanitary Engineers (ASSE) under Standard 1001.

D. All fixtures for water service shall meet the requirements of ANSI/ASME A112.18.1M-1989 and be certified by the Canadian Standards Association (CSA) under Standard CAN/CSA B.125.M89.

E. Water faucets and valves shall be fully assembled and individually tested at 80 pounds per square inch (PSI) water pressure.

IV. Valves for Gas, Air, Vacuum and Special Gas Service

A. Fine Control Needle Valves for High Pressure and Rare Gases*

[Note: Fine control needle valves are used for precise metering of all services and for working pressures up to 200 PSI air pressure.]

1. Fine control needle valves shall have a forged brass valve body with a 3/8" IPS female outlet for attachment of serrated hose ends, quick connects or other outlet fittings. Valves shall have a self-centering replaceable stainless steel floating cone and a replaceable stainless steel seat with a .125" diameter orifice. The floating cone shall have a maximum diameter of .125" and lateral movement not in excess of .015". The valve shall have a molded TFE stem packing with an externally adjustable packing nut. The valve shall go from closed to fully open in 8 full revolutions of the handle.

2. Fine control needle valves shall be fully assembled and individually tested at 300 PSI helium pressure under water. Maximum working pressure shall be 200 PSI air pressure

B. Needle Valves*

[Note: Standard needle valves are used for good metering of all services and for working pressures up to 125 PSI air pressure.]

1. Needle valves shall have a forged brass valve body with a 3/8" IPS female outlet for attachment of serrated hose ends, quick connects or other outlet fittings. Valves shall have a self-centering replaceable stainless steel floating cone and a replaceable stainless steel valve seat. The lateral movement of the cone shall not exceed .015". The valve shall have a molded TFE stem packing with an externally adjustable packing nut. The valve shall go from closed to fully open in two full revolutions of the handle.

2. Needle valves shall be fully assembled and individually tested at 190 PSI air pressure under water. Maximum working pressure shall be 125 PSI air pressure.

C. Laboratory Ball Valves*

[Note: Laboratory ball valves are used for on/off control of all services and where an AGA- and CGA-certified valve for gas service is desired.]

1. Laboratory ball valves shall have a forged brass valve body, a removable straight ten serration hose end and a forged brass lever-type handle with a full view color-coded index disc. Valves shall have a chrome plated ball and molded TFE seals with self-locking retainers. Where used for gas service, valves shall be certified by the American Gas Association (AGA) under ANSI Z21.15 ("Manually Operated Gas Valves") and by the Canadian Gas Association (CGA) under CAN/CGA-3.16-M88 (CLR 36).

2. Ball valves shall be individually tested at 125 PSI air pressure under water. The maximum working pressure for ball valves shall be 75 PSI air pressure. Where used for gas service, valves are AGA- and CGA-certified to 1/2 PSI.

V. Distilled, Deionized and Pure Water Fixtures

A. Tin-Lined Brass*

Faucets and valves for distilled, deionized and pure water service shall be fabricated of brass with an interior lining of pure tin. Tin lining shall be applied by (i) prior to machining, dipping faucet bodies and goosenecks in liquid tin to coat thoroughly all interior surfaces, and (ii) after machining, tin plating faucet bodies, goosenecks and all other fixture components to cover all exposed surfaces. Fixtures which are tin-plated only shall not be acceptable. Tin-lined brass fixtures shall have the same internal construction as specified for water faucets and valves in Section III above.

B. Polypropylene or PVDF-Lined Brass*

Faucets and valves for distilled, deionized and pure water service shall be fabricated with a brass exterior and an interior lining of inert [polypropylene] [polyvinylidene fluoride (PVDF)]*. All components in contact with pure water shall be [polypropylene] [PVDF]*. Valves shall be manual or self-closing type (as indicated by the fixture number), and shall have a round molded nylon handle, screw-on index disc and a removable serrated hose end. Valves shall have a brass valve body, brass bonnet and brass stem with a floating tip.

VI. Remote Control Valves for Fume Hoods

Remote control valves shall be mounted on the front panel of the fume hood, with all components subject to wear accessible from the exterior face of the hood. Valves shall have a threaded collar to hold the valve in place, and shall have a forged brass body and a forged brass four-arm handle with a full view color-coded type index disc. Valves for gas, air, vacuum and special gas service shall be needle-type design (either fine control or standard construction, as indicated by the fixture number), with a self-centering replaceable stainless steel floating cone and a replaceable stainless steel valve seat. Valves for water and steam service shall have a renewable flat valve disc and a replaceable stainless steel seat.

VII. Electric Pedestal Boxes

Electric pedestal boxes shall be cast aluminum with an integral base and shall have a [wrinkle black epoxy powder coated finish] [polished aluminum finish with clear epoxy coating] [satin aluminum finish with clear epoxy coating].* Pedestal boxes shall be machined for both standard and ground fault receptacles, and shall be furnished complete with grounding screw(s), mounting shank, locknut and washer. Electric pedestal boxes shall be listed by Underwriters Laboratories (UL) under Standard UL514A. Receptacles shall be commercial or specification grade. Face plates shall be Type 302 stainless steel with formed and beveled edges.

VIII. Safety Equipment

A. General

1. Provide emergency eye, eye/face wash and drench hose units with spray-type outlet heads to deliver a soft, wide, high volume spray of water. Outlet heads shall have an internal self-regulating flow control, a reticulated polyurethane filter, a threaded spray cover and a hinged swing-away dust cover. Hinged cover shall be permanently attached to outlet head body with a stainless steel pin. All wearing components shall be located inside spray head for ease of service.

2. All emergency eye wash and shower equipment shall be third-party certified to comply with ANSI Z358.1-1990.

B. Dual Purpose Eye Wash/Drench Hose Units*

Deck mounted eye wash/drench hose units shall be capable of use as a fixed eye wash with hands-free operation or as a drench hose. Units shall have two Gentle Spray outlet heads mounted parallel and angled forward, each with a self-regulating volume control, reticulated polyurethane filter and removable spray cover. Dust covers shall be hinged swing-away style and shall be permanently attached to the spray head with a stainless steel pin. The valve shall be self-closing type with a stainless steel squeeze handle and a locking clip to hold the valve open once activated. Units shall be furnished with a deck flange with locator guide to hold the unit facing forward and an 8 ft. reinforced PVC hose.

C. Single Head Drench Hose Units*

Deck mounted drench hose units shall have a single outlet head with a rubber protective collar and shall deliver an aerated flow of water. The valve shall be forged brass self-closing type with a stainless steel squeeze handle. Units shall be furnished with a deck flange and an 8 ft. reinforced PVC hose.