

2002

BACKFLOW PROTECTION

FOR
SAFE
DRINKING WATER
DATA BOOK

A Guide to the
Latest Regulations
Plus Qualified Contractors



South Bay Piping Industry Labor/Management Trust

400 Reed Street, PO Box 58032
Santa Clara, CA 95052
408.970.8578

www.sbaypipe.org/backflow/



“To safeguard our most precious commodity, our drinking water, is critical to the health of our community and the future of our society”

Acknowledgement

The South Bay Piping Industry would like to thank Navin Sahni, Backflow Prevention Instructor and Reinhard Hanselka, Director of Life Safety for their contributions to this Backflow Protection Handbook.

*The 2000 IAPMO Plumbing Code was the basis for all information in this pamphlet.

COVER YOUR LEGAL LIABILITY

Backflow Prevention Assembly Tests

California has adopted the 2000 IAPMO (International Association of Plumbing and Mechanical Officials) Uniform Plumbing Code. All Backflow Preventers, inside of your building or buildings, must be tested annually by a certified ASSE (American Society of Sanitary Engineers) or AWWA (American Water Works Association) Backflow Assembly tester. 2000 UPC (Uniform Plumbing Code) Table 14-1 and Sec 603.3.3.

- ASSE 1004-90 – Backflow Prevention Requirements for Commercial Dishwashing Machines.
- ASSE 1013-93 – Reduced Pressure Principle Backflow Preventers.
- ASSE 1015-93 – Double Check Backflow Prevention Assembly
- ASSE 1020-90 – Pressure Vacuum Breaker Assembly

The UPC Section 603.3.3 specially states "The premise owner or responsible person shall have the Backflow Prevention Assembly Tested by a certified Backflow Assembly Tester at the time of Installation, Repair or Relocation and at least on an annual schedule thereafter, or more often when required by the Administrative Authority."

It further states that periodic testing shall be performed in accordance with the procedures referenced in Table 14-1, or as per Title 17, California Public Health & Safety Code.

RESPONSIBILITY

It is your responsibility to check all the Backflow Preventers on your property. (Boilers, Chillers, Cooling Towers, etc). Except the Backflow Prevention Assembly near the Water Meter, which is tested by the water purveyor. Under Title 17 of the California Public Health & Safety Code.

Our ASSE & AWWA Qualified testers will inspect and test the Backflow Prevention Assemblies on your property and in your buildings and inform the local Administrative Authority with a certificate of your compliance with the law.

Protect your water supply, your employees, yourself and the Community.

For a list of contractors with qualified AWWA & ASSE testers refer to the last page of this booklet.

BACKFLOW PROTECTION DATA BOOK

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DEFINITIONS

Accessible — When applied to a fixture, connection, appliance, or equipment, "accessible" means having access thereto, but which first may require the removal of an access panel, door, or similar obstruction.

Air Gap — Water Distribution-The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying potable water to the flood level rim of any tank, vat or fixture.

ASSE — American Society of Sanitary Engineers

AWWA — American Water Works Association

Backflow — The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any sources other than its intended source. See Back-Siphonage, Back-Pressure Backflow.

Backflow Preventer — A device or means to prevent backflow into the potable water system.

Certified Backflow Tester — A person who has shown competence to test and maintain backflow assemblies to the satisfaction of the Administrative authority having jurisdiction.

DEFINITIONS cont...

CFC — California Fire Code – The fire code adopted by the State of California. Based on the Uniform Fire Code (UFC).

Contamination — An impairment of the quality of the potable water which creates an actual hazard to the public through poisoning or through the spread of disease by sewage, industrial fluids or waste, also defined as High Hazard.

CPC — California Plumbing Code – The plumbing code adopted by the State of California. Based on the Uniform Plumbing Code (UPC).

Cross Connection — Any connection or arrangement, physical or otherwise, between a potable water supply system and any plumbing fixture or any tank, receptor, equipment or device, through which it may be possible for non-potable, used, unclean, polluted and contaminated water, or other substances, to enter into any part of such potable water system under any condition.

Degree of Hazard — As per table. See page 11.

IAPMO — International Association of Plumbing and Mechanical Officials.

Labeling — For potable water – green background with white lettering.

DEFINITIONS cont...

Lethal — A substance which is detrimental to health, life or safety.

Pollutant — A substance which impairs the quality of potable water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use. Also defined as Low Hazard.

Potable Water — Water which is satisfactory for drinking, culinary, and domestic purposes and meets the requirements of the health authority having jurisdiction.

Readily Accessible — Direct access without the necessity of removing any panel, door, or similar obstruction.

Reclaimed Water — Is water once used and recycled. Labeled as purple (pantone color #512) background and shall be imprinted in nominal 1/2" (12.7 mm) high, black, upper case letters, with the words "CAUTION: RECLAIMED WATER, DO NOT DRINK"

UPC — Uniform Plumbing Code – The Model IAPMO Code which was the basis for the adoption of the California Plumbing Code.

SYNOPSIS

Except where not deemed necessary for safety or sanitation by the Administrative Authority, each plumbing fixture shall be provided with an adequate supply of potable running water piped thereto in an approved manner, so arranged as to flush and keep it in a clean and sanitary condition without danger of backflow or cross-connection. Water closets and urinals shall be flushed by means of an approved flush tank or flushometer valve. In jurisdictions which adopt Appendix J, water closets, urinals, and trap primers in designated non-residential buildings may be provided with reclaimed water as defined and regulated by Appendix J of the CPC.

GENERAL REQUIREMENTS

1. No installation of potable water supply piping or any part thereof shall be made in such a manner that it will be possible for used, unclean, polluted or contaminated water, mixtures, or substances to enter any portion of such piping from any tank, receptor, equipment, or plumbing fixture by reason of back-siphonage, by suction or any other cause, either during normal use and operation thereof or when any such tank, receptor, equipment, or plumbing fixture is flooded, or subject to pressure in excess of the operating pressure in the hot or cold water piping.
2. No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by any public or private water service system, and any pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water which has been used for any purpose whatsoever, or any piping carrying chemicals, liquids, gases, or any substances whatsoever, unless there is provided a backflow prevention device approved for the potential hazard and maintained in accordance with the Code.

GENERAL REQUIREMENTS CONT...

3. No plumbing fixture, device, or any construction shall be installed or maintained or shall be connected to any domestic water supply when such installation or connection may provide a possibility of polluting such water supply or may provide a cross-connection between a distributing system of water for drinking and domestic purposes and water which may become contaminated by such plumbing fixture, device, or any construction unless there is provided a backflow prevention device approved for the potential hazard.

Backflow Prevention Devices, Assemblies and Methods

Device, Assembly or Method 1	Degree of Hazard				Installation 2,3
	Pollution (Low Hazard)		Contamination (High Hazard)		
	Back Siphonage	Back Pressure	Back Siphonage	Back Pressure	
Airgap	✓		✓		See table in chapter
Atmospheric Vacuum Breaker	✓		✓		Upright Position. No valves downstream. Minimum of six (6) inches (152 mm) or Listed distance above all downstream piping and Flood level rim of Receptor. 4,5
Spill-Proof Pressure-Type Vacuum Breaker	✓		✓		Upright position. Minimum of six (6) inches (152 mm) or listed distance above all downstream piping and flood level rim of receptor.
Double-Check Valve Backflow Preventer	✓	✓			Horizontal, unless otherwise listed. Requires one (1) foot (305 mm) minimum clearance at bottom for Maintenance. May need Platform/ladder for test and Repair. Does not discharge Water.
Pressure Vacuum Breaker	✓		✓		Upright position. May have valves downstream. Minimum of twelve (12) inches (305 mm) above all downstream piping and flood level rim of receptor. May discharge water.
Reduced Pressure Principle Backflow Preventer	✓	✓	✓		Horizontal unless otherwise listed. Requires one (1) foot (305 mm) minimum clearance at bottom for maintenance. May need platform/ladder for test and Repair. May discharge Water.

- 1 See description of devices and assemblies in this chapter.
- 2 Installation in pit or vault requires previous approval by the Administrative Authority.
- 3 Refer to general and specific requirements for installation.
- 4 Not to be subjected to operating pressure for more than 12 hours in any 24 hour period.
- 5 For deck-mounted and equipment-mounted vacuum breakers, see CPC Section 603.4.16.

BACKFLOW REQUIREMENTS For Fire Protection Systems

1. Class 1: Direct connections from public water mains only. There are no pumps, tanks or reservoirs. No physical connections from other water suppliers, no anti-freeze or additives of any kind, or sprinkler drains discharging to atmosphere dry wells or other safe outlets. This system does not require a back flow preventer only a detector check valve.
2. Class 2: Same as Class one except booster pumps may be installed in the connections from the street mains. Booster pumps do not affect the potability of the system, however to avoid drafting so much water that water in the mains is reduced below 10 psi. This system does not require a back flow preventer. Only a detector check valve.
3. Class 3: Direct connection from public water supply main plus one or more of the following.
 - a. Elevated storage tanks
 - b. Fire pumps taking suction from above ground covered reservoirs or tanks. All storage facilities are filled or connected to public water only, the water in the tanks to be maintained in a potable condition. Otherwise Class 3 systems are the same as Class 1. Requires double check detector check assembly.

BACKFLOW REQUIREMENTS cont...

For Fire Protection Systems

4. Class 4: Directly supplied from public mains similar to Class 1 and 2 with an auxiliary water supply on or available to the premises, or an auxiliary supply located within 1700 ft of the pumper connection. Requires double check detector check assemble.
5. Class 5: Directly supplied from public mains and interconnected with auxiliary supplies such as pumps taking suctions from reservoirs exposed to contamination. Interconnected with rivers or ponds and driven wells, mills or other industrial water systems, or where anti freeze or other additives are used. Requires a reduced pressure detector check.
6. Class 6: Combined industrial and fire protection systems supplied from public water mains only with or without gravity storage or pump suction tanks. Requires reduced pressure and a meter.



**engineered
systems**

ACCO Engineered Systems

525 Laurelwood Road
Santa Clara, CA 95054

Phone: 408.982.9505

FAX: 408.982.9506

Contact: Danny Nielson, P.E.
Richard Yates

Specialties: Your needs are our focus here at ACCO. Our goal is to provide cost effective solutions to your demanding projects. Whether it requires basic plumbing or complex chemical handling, our team will deliver a quality installation on-time and on budget.

Plan & Spec, Design/Build or Assist, our specialists can provide products and services to meet your needs. From Bio-technology and organic synthesis, to semi-conductor and photonics fabrication, we install process systems to meet your manufacturing needs. For more information, see us on the web at www.accoes.com.

Established 1934

Service Area: Western United States

DIRECTORY OF CONTRACTORS



CAL-AIR, INC.

1555 South Seventh Street
San Jose, CA 95112

Phone: 408.283.2300

FAX: 408.293.9511

<http://www.calair.com>

Contact: Ken Salazar, Service

Randy Richter, Construction

Specialties: As one of the largest design-build mechanical companies in the state, we have a complete in house engineering staff with extensive experience in commercial, industrial hi-technology, laboratory and clean room and bio-tech facilities.

Our services include backflow prevention certification and repair, preventive maintenance, predictive maintenance, guaranteed maintenance, 24 hour emergency service, energy services, building automation system design/installation, design build systems for high purity gas and liquid piping, process piping, double containment piping, deionized water systems, toxic and hazardous waste, process equipment hook-up for clean rooms, plumbing, HVAC and sheet metal fabrication, and quick response projects.

Cal-Air's tradition of quality provides our customers with new, unique and cost effective solutions from our 12 offices located throughout California.

Established in 1953.

Service area: California



Ciari Plumbing

1054 Elm St.

San Jose, CA 95126

Phone: 408.296.6010

FAX: 408.296.0645

Contact: Steve Ciari

"Serving Santa Clara and San Benito counties for more than 30 years."



DEBELLA
MECHANICAL, INC.

De Bella Mechanical, Inc.

625 Nuttman Street
Santa Clara, CA 95054

Phone: 408.980.8741

FAX: 408.980.8744

Contact: Paul De Bella

Specialties: De Bella Mechanical, Incorporated provides a wide range of process piping and mechanical services to support the high-tech microelectronics and biopharmaceutical industries.

Designed to be flexible, efficient and responsive to customer needs, De Bella delivers positive results with innovative solutions.

Established in 1987

Service Area: West coast and Hawaii

DIRECTORY OF CONTRACTORS



e *nvironmental*
s *ystems*
i *nc.*

Environmental Systems Inc.

3353 De La Cruz Blvd.
Santa Clara, CA 95054

Phone: 408.980.1711

FAX: 408.980.0714

Contact: Phil Infantino

Chris Infantino

Specialties: Design Build Systems for piping, plumbing and HVAC; environmental chambers, chiller replacement; double-containment piping, high-purity gas and liquid piping, vacuum piping; biotech, certified clean rooms, metal fabrication, service and maintenance for all systems.

Established in 1975.

Service area: California, Mexico, Korea



Backflow Prevention Specialists

Competitive Rates

Phone: 408.736.4938

FAX: 408.736.4055

Web: www.wlhs.com

Providing quality residential
and commercial plumbing
installations throughout the
Bay Area since 1904.



ICOM Mechanical, Inc.

477 Burke St.

San Jose, CA 95112

Phone: 408.792.2200

FAX: 408.292.4968

Contact: Dan Littleton

danl@icominc.com

Specialties: **ICOM Mechanical, Inc.** was founded in 1981 with the intent to provide clients with the most professional, highest quality service possible. Our firm represents excellence in design, installation, maintenance and repair of HVAC, process piping systems and plumbing.

ICOM is comprised of the following departments:

- **Design and Engineering** — HVAC, Process Piping, Controls, Plumbing
- **Construction** — HVAC, Process Piping, Plumbing, Controls
- **Service** — Commissioning (Start-up), Maintenance & Repair on Mechanical Systems, Back Flow Prevention, Environmental and Process Controls, 24 Hour Emergency Repair

Service area: West Coast

ISO 9001 Certified



System Solutions
for a Changing World

Kinetics

33225 Western Ave.
Union City, CA 94587

Phone: 510.675.6000

FAX: 510.675.6187

www.kineticsgroup.com

Specialties: Kinetics is a leading provider of high-purity process systems to the semiconductor, biotechnology, and pharmaceutical industries. Kinetics offers a full range of products and services including engineering, design fabrication, installation, chemical and slurry distribution, chillers, gas panels, MFCs, modular gas systems, HVAC, and QA/QC. With 25 years of experience, and resources spanning the globe. Kinetics offers turnkey, design/build solutions with the assurance of single-source accountability.

Service area: West Coast

DIRECTORY OF CONTRACTORS

Oh See!

O.C. McDONALD CO., INC.

O.C. McDonald Co., Inc.

1150 W. San Carlos St.

San Jose, CA 95126

Phone: 408.295.2182

FAX: 408.295.0626

email: ocm@ocmcdonald.com

web: www.ocmcdonald.com

Contact: Service Department for

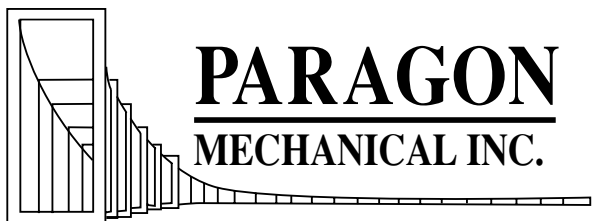
*Certified Specialists

Specialties: Serving — Biotech Facilities; Pharmaceutical; Semiconductor; Disc Manufacturers; Chemical Companies; Telecommunication; Aerospace; Utilities; Government Bldgs.; Manufacturing; Hospitals; Apartments; Hotels; Office Complexes; Food Processing; High Rise Buildings; General Contractors; Industrial Plants; Airports.

Isolation Containment — All Sizes up to 12"; Pressure Vacuum Breakers; Double Check Valves; Reduced Pressure Assemblies; Cross Connection; Custom Service Plan to test, survey, repair, and certify all devices Annually.

Other Specialties — High Purity Process Piping; Medical Gas Stations; Stainless Steel Piping; Mechanical & HVAC Systems; Clean Room Fabrication; Ultra Pure Water Systems; Preventive Maintenance For HVAC Systems.

Service Area: Santa Clara County, Alameda County, San Mateo County, Santa Cruz, Carmel and the Central Valley.



Paragon Mechanical Inc.

2460 Dela Cruz Blvd
Santa Clara, CA 95050

Phone: 408.727.7303

FAX: 408.566.6190

Contact: John Watson/Jeff Miller

Specialties: Design/Build; Microelectronics;
Bio-Pharma-ceutical; Clean Rooms;
Laboratories; Medical Gases; Process Piping;
HVAC; Architectural Sheet Metal; and Metal
Roofing.

Service Area: California

DIRECTORY OF CONTRACTORS



Purity Systems, Inc.

1933 O'Toole Ave., Suite A104
San Jose, CA 95131

Phone: 408.435.9119

FAX: 408.435.1155

email: reidh@puritysystems.com

shawnl@puritysystems.com

Contact: Reid Howard

Shawn Lambeth

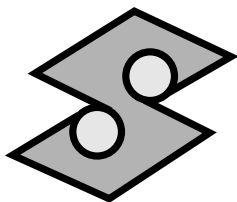
Specialties: Purity Systems, Inc. has provided Professional, Scientific, and Technical Services to Microelectronics, Biotech, Pharmaceutical, and Aerospace Industries since 1984. We specialize in Quality Assurance Inspection and Testing of Ultra High Purity Process Piping Systems including: Analytical Testing PPB range; Helium Leak Detection, Borescope Inspection, Code Consulting, HazMat Consulting, Design and Specification Review, Metallurgical Consulting, Corrosion Consulting, ASME Code Compliance, and Failure Analysis.

All Inspectors and Technicians are qualified to ASNT-SNT-TC-1A MSLT Level II or VT Level II. On staff P.E.

Welding/Metallurgical Engineer & PhD Material Scientist.

Purity Systems is your partner in Quality

A local presence with global capabilities



SCOTT CO.

Scott

1717 Doolittle Drive
San Leandro, CA 94577-0655

Phone: 510.895.2333

FAX: 510.895.6621

www.scotco.com

Contact: Larry Hengel

Paul Yalsovak

Specialties: Scott Co. of California is a full-service mechanical contractor involved in all disciplines for nearly 100 years. Our services include high-purity process piping, HVAC, custom sheet-metal fabrication, plumbing (conventional and hazardous products), fire protection, engineering, design/build and design assist/build.

We have been actively involved in the biopharmaceutical, chemical, microelectronics and related high-technology industries.

Service Area: Nationwide — International



Southland Industries

775 Commercial Street
San Jose, CA 95112

Phone: 408.970.3777

FAX: 408.970.3776

www.southlandind.com

Specialties: As the 6th largest design build mechanical contractor in the nation SI is focused on our core purpose of "Building Customers for Life".

SI specializes in design and construction of HVAC, Plumbing, Process Piping systems, and the service of them.

We have extensive experience in semiconductor, biotechnology, industrial, and commercial applications. Call us and put our 55+ years of experience to work for you helping with solutions to your facilities needs.

Service Area: Nationwide



Therma, Inc.

1601 Las Plumas Avenue
San Jose, CA 95133-1613

Phone: 408.347.3400

FAX: 408.347.3434

www.therma.com

Contact: Service Department

Specialties: Founded in 1967, Therma is the largest full service mechanical contractor in the Bay Area. Our focus has been on the multi-faceted needs of the industrial, commercial, electronic, and biopharmaceutical users. Our installers include HVAC, Piping and Plumbing projects throughout California.



Thermal Mechanical Inc.

425 Aldo Avenue
Santa Clara, CA 95054

Phone: 408.988.8744

FAX: 408.988.0233

Contact: Richard Rood

thermal@thermalmech.com

Specialties: Commercial and industrial process piping; plumbing; HVAC; design and installation; clean rooms; low-temperature and environmental systems; special applications.

Design, Sales, Construction and Service Department serving the San Francisco Bay Area.

Since 1969.