



Via E-mail: mike.halpin@dep.state.fl.us

May 2, 2011

Mr. Michael P. Halpin, P.E.
Administrator, Siting Coordination Office
Department of Environmental Protection
2600 Blair Stone Road, MS48
Tallahassee, FL 32399-3000

Re: Amendment Request
Installation of a Recarbonation System to the potable water system
Stanton Energy Center – Orlando, FL

Dear Mr. Halpin,

OUC requests the Siting Office to review the enclosed information concerning the installation of a recarbonation system to the potable water system at the Stanton Energy Center. Also a hard copy will be delivered to Richard Lott, Manager of Drinking Water Permitting, FDEP-Central District for review.

The request is proposed as an amendment to the Stanton Site Certification. We look forward to working with you and your staff on this project. If you have any questions concerning this request, please call me at 407-434-4288 or Mark Corbett at 407-434-3002.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Garfield Blair', is written over a horizontal line.

Garfield Blair, Director
Environmental Affairs

ORLANDO UTILITIES COMMISSION

Amendment Request

Proposed Amendment

The Orlando Utilities Commission (OUC) requests an amendment to the Stanton Energy Center Site Certification Application to install a Recarbonation System to the potable water system at the Stanton Energy Center.

Purpose/Reason for Amendment

The purpose of this amendment is to begin recarbonating the lime softened water at the Stanton Energy Center. The primary purpose of this is to lower the pH of the finished water after softening to stabilize the water and prevent scaling in the filters and distribution mains. This will be accomplished by the control feed of carbon dioxide gas to control the pH of the finished water.

Technical Description of Amendment

Approval of this amendment would allow the addition of a carbon dioxide gas feed system to the potable water system at the Stanton Energy Center. The on-site water treatment plant receives water from two on-site potable water wells. The raw water is pumped to an air stripper to remove hydrogen sulfide gases and then goes to a reactor/softener. From the reactor/softener the water flow through dual sand and anthracite filters to a 75,000 gallon clearwell where it is chlorinated for disinfection and residual. The water is then pumped into a 500,000 gallon above ground storage tank. From the above ground storage the finished water is then pumped into the distribution system for use in the plant and for steam generation.

The recarbonation system will contain two (2) 417 lb Dewar tanks. Stainless steel tubing will be used to feed the carbon dioxide gas to a diffuser that will introduce the carbon dioxide gas into the water just before it enters into the dual sand and anthracite filters.

Environmental Consequences of Amendment

OUC anticipates no adverse environmental impacts resulting from the approval and implementation of this amendment. The installation of the recarbonation system will improve the quality of the water that is used at the Stanton Energy Center. This will also result in higher quality make-up water used in steam generation and reduce the amount of sulfuric and caustic acid required to regenerate the ion exchange resins necessary for high purity water.

Effect of Amendment on Certification/Conditions of Certification

OUC believes that this proposed amendment makes no change to the existing Conditions of Certification and thus is not a modification to the Conditions of Certification.

Submittal Package Included

A hard copy of the submittal package with the appropriate application forms and supporting documentation was sent to Richard Lott, FDEP-Central District.

FLORIDA RURAL WATER ASSOCIATION

2970 WELLINGTON CIRCLE • TALLAHASSEE, FL 32309-7813

(850) 668-2746

March 21, 2011

Mr. Richard Lott, PG, PE
Drinking Water Program
FDEP Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767
Phone: 407-893-3325

**Re: Stanton Energy Center Water Treatment Plant Recabonation
Orlando Utilities Commission, Orange Co, PWS: 3484130**

Dear Mr. Lott:

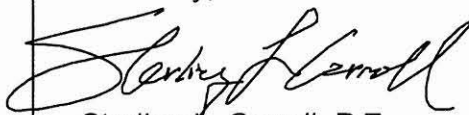
Florida Rural Water Association is pleased to submit this application for Orlando Utilities Commission for its Stanton Energy Center Water Treatment Plant Recabonation as a membership service. FRWA is dedicated to helping water and wastewater systems provide Floridians with an ample affordable supply of high quality water, while protecting natural systems.

The permittee wishes to add feed system that will allow the controlled addition of carbon dioxide gas into the lime softener water between the accelator / clarifier and before the gravity filters. The purpose of the project is to recarbonate the softened water that has a high pH of 8.0 to 8.5. The installation of the recarbonation system is intended to improve the quality of the effluent water and will reduce the load the treated water puts on demineralizers and polishers at the steam generation plant. The improved quality make-up water for the steam generator will result in reduced sulfur acid and caustic feed rates for the ion exchange resin regeneration needed for high purity waters.

Should you have any questions or this package does not satisfy your needs, I kindly request that you call or e-mail me at your earliest convenience before sending a Request for Additional Information.

Please feel free to contact Lauren Walker-Coleman or me if you have any further questions.

Sincerely,



Sterling L. Carroll, P.E.
FL PE #46151
FRWA State Engineer

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**Preliminary Engineering Report
&
Permit Application Package**

**Orlando Utilities
Commission**

**Stanton Energy Center
Water Treatment Plant
Recabonation**

Orange Co, PWS: 3484130



Florida Rural Water Association

2970 Wellington Circle ~ Suite 101 ~ Tallahassee FL 32309
Telephone: 850-668-2746 ~ Fax: 850-893-4581
e-mail: FRWA@frwa.net



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Chapter 1 - Project Introduction

1-0 ~ Project Description (Problem Statement). The Orlando Utilities Commission Stanton Energy Center Water Treatment Plant's lime softened water has a high pH of 8.0 to 8.5. The permittee wishes to add feed system that will allow the controlled addition of carbon dioxide gas into the lime softener water between the accelator / clarifier and before the gravity filters. It is well known that carbon dioxide plays an important role as a pH / carbonate buffer. Carbon dioxide buffers the water and stabilizes pH. Carbon dioxide quickly combines in water to form bicarbonate ions and dissolved carbon dioxide, with carbonic acid. The bicarbonate ion can neutralize hydrogen ions, which cause a decrease in the pH. The carbonic acid can neutralize hydroxide ions, which increase the pH of the water.

1-1 ~ Project Purpose. The purpose of the project is to recarbonate the softened water that has a high pH of 8.0 to 8.5. The installation of the recarbonation system is intended to improve the quality of the effluent water and will reduce the load the treated water puts on demineralizers and polishers at the steam generation plant. The improved quality make-up water for the steam generator will result in reduced sulfur acid and caustic feed rates for the ion exchange resin regeneration needed for high purity waters.

1-2 ~ Brief Description and Action Plan (Installation Narrative). The Stanton Energy Center operates a 2,000 gpm Water Treatment Plant for steam generation and potable uses. Raw water comes from two 1,200 gpm wells that operate alternitvely, lead / lag basis. The raw is pumped the air stripper water to remove / reduce hydrogen sulfide and then goes to the lime softener accelator / clarifier, filtration by dual gravity sand filters, and then chlorination. The 75,000-gallon clear well collects the chlorinated filter effluent and is conveyed by two transfer pump[s] to the 500,000 gallon ground storage tank. The finished water is pumped to the distribution system.

The recarbonation system will be calibrated by the alkalinity and flow rate at the accelator / clarifier. Estimated carbon dioxide usage is estimated at less than 95 SCFH (standard cubic feet per hour) based on previous flow rates and alkalinity measurements.

The carbon dioxide feed system consists of:

- CO₂ tank (417 lb Dewar) with single stage, electrically heated regulator
- Pressure regulator (3008 Praxair)
- 0 to 1000 SCFH flow controller (Dyer 67C Series)
- Solenoid valve, off / on (ASCO Red-Hat 8030-2)
- Manual ball valve
- CO₂ injector / diffuser tube

The carbon dioxide feed system consists of a single stage, electrically heated regulator attached to the discharge of the CO₂ tank to reduce the tank pressure for system use. The carbon dioxide will then pass through a second regulator that control system pressure to the 0 to 1000 SCFH flow controller, which is manually adjusted based on grab sample pH measurements and flow rates. Next the CO₂ passes through a solenoid valve, which closes when the water system is off. The solenoid valve is located at the solenoid valve CO₂ injector / diffuser. The diffuser injects the CO₂ gas into the lime softened water between the accelator / clarifier and before the gravity filters. Daily grab samples will be taken and logged for pH for benchmarking and determining the CO₂ gas feed rate adjustments.

The installation will not interfere or disrupt normal plant operations. The installation of the CO₂ gas will not require chlorination.

The Orlando Utilities Commission, Staton Energy Center is a Non-Transient Non-Community (NTNC) Water System.

Estimate of Construct Cost – Out of Pocket project costs should be under \$20,000. FRWA technical / engineering assistance are provided at NO COST to Orlando Utilities Commission. Total donated costs are estimated at \$15,000 to \$25,000.

1-3 ~ Water System Design Considerations, Standards & Reliability.

This project is intended to address National Primary and Secondary Drinking Water Standards as adopted by the Florida Department of Environmental Protection. The purposed purpose of this project is to comply with the Maximum Contaminant Levels (MCLs) as listed in Tables 1 thru 6 of rule 62-550, FAC., including results of finished water quality analyses.

Good engineering and prudent utility practice has been used in all aspects of water system design (in accordance with 62-555 FAC, Ten State Standards for Water Works and applicable industry standards). The design engineer has considered operation of the system under a full range of expected demands (minimum to maximum), and under emergency conditions. Recommendations contained herein have been developed to ensure that public health would not be jeopardized due to insufficient facility sizing, water quality problems, or reliability issues.

The water system exigencies have been balanced against the best professional standards and regulatory issues. The sizing of facilities should be such that water demands during peak day or peak hour operating conditions, (i.e., when water use is at its highest) can be met for all customers.

Water system reliability considerations are important to ensure sufficient source (wells), treatment, water quality, storage, pumping capacity, and distribution hydraulic capacity in the water system. Consumers may accept interruptions to water service for emergencies or scheduled maintenance. Emergencies can include fires, hurricanes, tornados, power outages, water main breaks, unexpected mechanical or treatment process failures.

Regular preventative maintenance can involve system flushing, cleaning, maintenance or repair. Consumers will quickly, however, find it unacceptable, to be out of water frequently and with no notice. Reoccurring interruptions resulting in pressures below 20 psi require Precautionary Boil Water Notices further decrease customer patience or esteem. Correspondingly, consumer expectations will drive many decisions regarding improvements that provide higher levels of reliability for the system.

Chapter 2 - Existing System Conditions

2-0 ~ Existing System & Water Demand. The fundamental consideration for the sizing of any water system or evaluating the water system, or its component parts, is an estimate of the amount of water used by the customers on the system.

→ Stanton Energy Center Water Treatment Plant

Population	200	from Sanitary Survey
Permitted Design Capacity	2.00 MGD	from Sanitary Survey
Connections	1	from Sanitary Survey
Average Day Demand	0.468 MGD	from MORs
Maximum Day Demand	1.244 MGD	from MORs 09/09

2-1 ~ Projected Growth & Demand Projections. Orlando Utilities Commission Stanton Energy Center Water Treatment Plant is at build-out and does not anticipate growth. Historical water use trends are not changing.

2-2 ~ Capacity of Drinking Water Source and Treatment Facilities. Rule 62-555.320(6) governs the capacity of drinking water source and treatment facilities and permitted operating capacity. For the purposes of this engineering report the following terms are defined:

Average Daily Demand (ADD) is the estimated average quantity over a one-year period of daily water usage in gallons per day (gpd) for the water system. Based on experience and research for Florida the average daily demand for a typical residential home is between 200 and 350 gpd -- the most likely value being 250 gpd (or 0.17 gpm/ERC). Mobile Home Parks typically use between 150 to 185 gpd.

Equivalent Residential Connection (ERC) is the typical demand a residential home places on the water, usually between 200 and 350 gpd -- the most likely ERC value being 250 gpd for ADD. This assumes normal irrigation rates.

Maximum Daily Demand (MDD) is the estimated highest quantity of daily water usage in a year in gallons per day (gpd) for the water system.

MDD:ADD Peaking Factor based on experience and research of Florida community water systems the ratio of maximum daily demand to average daily demand is typically 1.85:1 -- the most likely ERC value being 462 gpd for MDD. The normal range is from 1.5:1 to 3.5:1. (See "Water Treatment Principles and Design", First Edition, James M. Montgomery Engineers, pp 444-446).

Peak Hour Demand (PHD) is the estimated rate of water usage during the highest hour use generally on a maximum usage day in gallons per minute (gpm) for the water system.

PHD:MDD Peaking Factor based on experience and research of Florida community water systems the ratio of peak hour demand to maximum daily demand is typically 2:1 -- the most likely ERC value being 0.64 gpm for PHD. The normal range is from 1.35:1 to 5:1. (See "Water Treatment Principles and Design", First Edition, James M. Montgomery Engineers, pp

444-446). Peaking ratios are typically higher for intuitional, commercial, and industrial customers.

Peak Instantaneous Demand (PID) is used for sizing hydropneumatic tanks. Ten States Standards "Recommended Standards for Water Works" section 7.2.2 states that *"the capacity of the wells and pumps in a hydropneumatic system should be at least ten times the average daily consumption rate."* Thus, ten (10) times Average Daily Demand = Peak Instantaneous Water Demand (PID), or $PID = 10 \times ADD$

➔ The capacity of the well, and well pump:

Well Pump (2) 1,200 gpm **2,400 gpm**

2-3 ~ The Existing Flow Diagram & Components in Order of Flow. The Existing Flow Diagram is shown in Enclosure E-2.

2-4 ~ The Proposed Flow Diagram & Components in Order of Flow. The Proposed Flow Diagram is shown in Enclosure E-2.

2-5 ~ Name / Location of Existing Water Sources, Plants & Pumps

Well and Storage Locations are clearly shown on the attached drawings. Treatment is Category IV Primary Treatment per 62-699.310 (4)(e).

Well	Well PIB (AAE8494)	PIA (AAC0781)
Existing Service	Potable Water	Potable Water
Year Drilled	1984	1984
Depth	530-ft	505-ft
Type of Grout	Neat cement	Neat cement
Casing Depth	233-ft	243-ft
Casing Diameter	14-inches	14-inches
Static Water	44-ft	44-ft
Pumps (hp)	60 hp	60 hp
Pumps (gpm)	850 gpm	850 gpm

Comments: Well Pump capacities changed in inspection records from 1100 gpm to 850 gpm per response to 3/29/04 sanitary survey inspection.

Chapter 3 - Construction Specifications & Technical Notes

1. These Technical Specifications and General Notes and accompanying drawings require approval of the Florida Department of Environmental Protection or Approved County Health Department. No construction work on this system shall be started prior to receipt of written approval.
2. Any discrepancies in the drawings or specifications shall be brought to the attention of the FRWA Engineer immediately. The FRWA Engineer will provide any clarification necessary.
3. The Installer shall note any discrepancies and show any changes on the drawing in redline. The relined drawings shall be provided to the FRWA Engineer for Final Certification.
4. **48 HOURS BEFORE DIGGING -- CALL LOCAL UTILITIES LOCATION SERVICE(S).** The Installer is to notify the local one-call UTILITY locations service 48-hours before digging – including the local water / wastewater utility system, and all other local UTILITY companies: Power, Telephone, Cable TV, Fiber Optic Cable, and Natural Gas.
5. The location and size of all existing utilities shown on the plans are approximate and are based on the best available information. Additional utilities may exist which are not shown on the plans. The Installer shall be responsible for the location of all existing utilities. The Installer shall verify all utilities by electronic methods and by hand excavation, prior to beginning any construction operations. Any and all conflicts of existing utilities with proposed improvements shall be resolved by the FRWA Engineer and the Owner prior to beginning any construction operations.
6. All damage to existing utilities shall be repaired by the Contractor at no additional cost to the Owner, and all existing service lines shall be protected or replaced by the Contractor at no additional cost.
7. The Contractor shall employ only competent and skilled personnel on the work. At all times when the work is in progress, the Contractor shall have a competent superintendent or foreman present with authority to receive orders and execute the work. The Contractor shall, upon demand from the Owner and/or the FRWA Engineer, immediately remove any superintendent, foreman, or worker whom the Owner and/or FRWA Engineer may consider incompetent, undesirable, or both
8. The Contractor shall maintain all water supply and sanitary sewer service throughout construction of this project. The Installer shall maintain existing services until the new lines have been approved by the Florida Department of Environmental Protection or Approved County Health Department.
9. The “**TRENCH SAFETY ACT**” shall be incorporated into this contract as enhanced by the legislature of the State of Florida to be in effect as of the most recent version.
10. All construction work in rights-of-ways or streets shall be done in accordance with the FDOT Maintenance of Traffic standards, rules and regulations or the agency having control. Contractor shall furnish all safety equipment and markings. It shall be the responsibility of the Contractor to notify the controlling entity before doing any work within the right-of-way

11. All construction work shall be performed in accordance with established construction safety standards, and the Contractor shall be responsible for the safety of his employees and the public.
12. All water piping and valves shall be Schedule 40 or 80 and shall be stamped and certified for use with potable water. Because of the nature of the site, all piping shall be field run and the attached drawings only depict the proposed route. All pipe supports will be uni-strut fiberglass or Schedule 80 PVC on minimum 48-inch centers. All connections will be socket-welded with the exception of some fittings on the pump skid which will be threaded connections using two wraps of teflon tape and bottom fittings on the bulk storage tanks which will be a bolted flanged connection. Water System Pipe shall be Polyvinyl Chloride (PVC), High density Polyethylene (HDPE) or Ductile Iron Pipe (DIP).
 - PVC (4-inches and smaller) shall be Schedule 40 or 80 manufactured in compliance with ASTM D1785. We strongly recommend that any piping exposed to ultraviolet rays be Schedule 80.
 - PVC (4-inches thru 12-inches) shall be DR-18 manufactured in compliance with AWWA C900, and PVC (14-inches thru 20-inches) shall be DR-18 in compliance with AWWA C905.
 - HDPE pipe shall be in compliance with D3035 and ASTM F-714.
 - HDPE Tubing shall meet the requirements of AWWA C901, SDR 9.
 - DIP shall be a minimum Class 50, conforming to the latest standards of ANSI/AWWA C150/A21.50 for thickness design of ductile iron pipe and ANSI/AWWA C151/A21.51 for ductile iron pipe centrifugally cast in metal molds or sand-lined molds.
13. ALL water mains are to have a minimum cover of 36-Inches, unless otherwise noted. Pipe shall be laid in sand or natural soil. Backfill soil around and against pipeline shall not contain stones or sharp objects $\frac{3}{4}$ -inch in size or larger.
14. If service must be cutoff to existing customers, the Owner should have THREE DAYS NOTICE to make necessary notifications. The Installer shall issue a 72-hour boil water notice to all affected businesses and residences.
15. Foreign material shall be kept out of the pipe or cleaned from the pipe prior to its installation. Upon completion of the installation, the mains shall be flushed and the water disposed of, without creating a nuisance. Flushing must achieve a minimum water velocity of 2.5 feet per second in all segments of the pipe.
16. **HYDROSTATIC TESTING.** Installer shall provide all equipment (including a pressure gauge) and materials and labor necessary for pressure and leakage testing. All mains and services shall be tested for leakage. Water shall be supplied to the main at the expense of the developer and Installer and pumped to the required pressure of 60 psi. The main tested shall either be isolated from active potable lines or protected from leakage by a double valve arrangement all water utilized for the pressure and leakage test shall be potable water with an adequate chlorine residual and shall meet the requirements of the ANSI/AWWA C 605-94 for PVC Pipe.
17. **As-Built Drawings**

The contractor shall supply at the conclusion of the project an As-Built drawing (sketch to scale showing pertinent features and connections is acceptable) to Florida Rural Water Association, that includes actual measurements that show all facilities and connections that were installed by the contractor.

APPENDICES

- A-1 Instructions for Construction Inspection & Final Approval
- A-2 Checklist Applying for Public Water System Construction Permits per
FDEP Rule 62-555.520(4)(a)&(b)

APPENDIX A-1

Instructions for Construction Inspection & Final Approval

BEFORE you can use ANY of the newly installed water system components they MUST be approved and cleared for permanent operation by the FDEP or DOH per 62-555.345 FAC -- *otherwise you may be subject to fines.*

FRWA Engineering Staff will need the following items to make our determination if the system is acceptable and provide the documentation to FDEP (Final Certification).

1. Call your FRWA Circuit Rider and ask if he would come by and inspect your installation. We must have him tell us it's installed correctly in compliance with Florida Law, 61G15-18.011 (1) Florida Administrative Code.
 - The Circuit Rider should markup the installation drawings using red-pencil or pen showing any changes made. If no changes were made, indicate the following clearly on the design drawing, "INSTALLED WITHOUT MODIFICATION" – or something similar on the drawings with the date and initials.
2. Please take photographs (24 or more, on a CD or digital) of the finished water system modifications (inside and out of the water well system) – to show any changes that have occurred and in enough detail to allow use to verify the installation.
 - If you don't have a digital camera just use a regular film camera, take a whole roll, and have a CD made during developing and send the CD or e-mail them to us at FRWA.
 - Also take measurements of critical installation components per the permit drawings.
3. Provide any required bacteriological test results, demonstrating compliance with rule 62-555.315(6) or 62-555.340, FAC, if any of the new or altered PWS components must be disinfected and bacteriologically surveyed or evaluated.
4. Provide any required analytical test results demonstrating compliance with Part III of Chapter 62-550 or 62-524.650(2), FAC, if any of the new or altered PWS components are necessary to achieve, or affect compliance.

AFTER we've received the information listed above -- we will send you a completed Final Certification Form [62-555.900(9), Certification of Construction Completion and Request for Clearance to Place Permitted PWS Components into Operation]. You must sign the Final Certification Form in 3 places and send the package back on to FDEP or DOH. If this package is not submitted in a timely fashion to DEP you may be subject to fines.

The Department has 14 days after receiving the Final Certification Form to let you know if there is anything that will prevent the new or altered components from functioning in compliance with the rules.

Within 30 days after receiving the Final Certification Form the Department must inspect the "new system".

- If the Department finds anything that will prevent the new or altered components from functioning in compliance with the rules or cause noncompliance, the Department shall issue a written request for corrective action and for resubmittal of the certification within 30-days of the review/inspection period.
- If the Department receives a satisfactory Final Certification Form it will issue written approval, or clearance, to place the new or altered components into permanent operation.
- You must WAIT until you receive the Department's Written Clearance before you turn on the new components.

APPENDIX A-2

FDEP Rule 62-555.520(4)(a)&(b) Checklist Applying for Public Water System Construction Permits

Rule #	Subject / Title	Applicable to PER?	Response or Additional Comments
(4)(a)	PER prepared, signed and sealed under the responsible charge of a Florida PE	Yes	None
(4)(a)1.	Brief Description of Project, Purpose and Estimate of Cost	Yes	See Chapter 1 above
(4)(a)2.	Description of Existing Water System & Discussion of Project Impacts	Yes	See Chapter 2 above
(4)(a)3.	Water Service Area, Water Use, and Water Service Pressure	N/A	No changes to the water service area are proposed. No new connections are anticipated. The water system is not interconnected with any other system. No fire protection is provided and none is required.
(4)(a)4.	New or Altered Drinking Water Source Facilities	N/A	No changes are proposed
(4)(a)5.	New or Altered Source Water or Treatment Facilities	N/A	No changes are proposed
(4)(a)5.a.	Design Capacity of Source Water and Plant's Treatment Facilities	N/A	No changes are proposed
(4)(a)5.b.	Water Quality Data for new or altered wells	N/A	No changes are proposed
(4)(a)5.c.	Applicable Primary or Secondary Drinking Water Standards	N/A	No changes are proposed
(4)(a)5.d.	Evaluation of the Adequacy of new, altered, or existing treatment facilities	N/A	No changes are proposed
(4)(a)6.a.	Design Daily Operating Period	Yes	WTP is designed to operate 24-hours per day
(4)(a)6.b.	Existing / New Flow Diagram	Yes	See Chapters 2 & 3 above
(4)(a)6.c.	Hydraulic Profile	N/A	See Chapter 3 above for well pump evaluation - pressure losses will not be altered
(4)(a)6.d.	CT Calculations for Cryptosporidium, Giardia lamblia, or Virus Inactivation	N/A	This system not influenced by surface water and has no treatment units open to the atmosphere.
(4)(a)6.e.	Design Dose of Water Treatment Chemicals	Yes	See Chapter 1 above – Carbon Dioxide for pH buffering
(4)(a)6.f.	Evaluation of types, quantities, and characteristics of residuals generated	N/A	No residuals will be generated
(4)(a)6.g.	Sizes, Capacities, Retention Times, Loading Rates, Schematic Diagrams, and Other Design Parameters	Yes	See Chapters 1 & 2 above and attached drawings
(4)(a)6.h.	Innovative or Alternative Processes and Equipment	N/A	No innovative or alternative processes and equipment are proposed
(4)(a)6.i.	Odor Control Requirements	N/A	No Odor Control Requirements
(4)(a)6.j.	New or Altered [Underground Petroleum] Storage Tank Systems	N/A	New or Altered [Underground Petroleum] Storage Tank Systems
(4)(a)6.k.	Housing and Safety or Protective Equipment	Yes	Using the same safety or protective equipment as required for chlorine – separate housing for Sodium Hypochlorite equipment
(4)(a)6.l.	New or Altered Fluoridation Facilities	N/A	No Fluoridation Facilities are proposed
(4)(a)7.	New or Altered Water Pumping Facilities	N/A	No changes are proposed

Rule #	Subject / Title	Applicable to PER?	Response or Additional Comments
(4)(a)8.	New or Altered, Finished-Drinking-Water Storage Facilities	N/A	No changes are proposed
(4)(a)9.	New or Altered Water Mains, including treatment plant process piping	N/A	No changes are proposed
(4)(a)10.a.	Project Site Plan	Yes	See attached drawings
(4)(a)10.b.	Avoid Sites with risk from floods, fires, or other disasters	Yes	The site is not subject to significant risk from significant risk from floods, fires, or other disasters.
(4)(a)10.c.	Site protected from physical damage by the 100-year flood	Yes	The subject property does not lie within a 100, 25 or 10-year flood plain
(4)(a)10.d.	Approximate ground water elevations in relation to subsurface structure	N/A	No subsurface structures are proposed
(4)(a)10.e.	Security features for wells, treatment, pumping, & storage facilities	Yes	The wells, treatment, pumping, & storage facilities have A security fences. FRWA provides training and templates for Emergency Response Plans and Vulnerability Assessments per Rule 62-555.350(15) FAC.
(4)(a)10.f.	Aggressive soils or contaminated areas by low-molecular-weight petroleum products or solvents	N/A	We have no knowledge of areas within the project site with aggressive / contaminated soils
(4)(a)11.	Materials used comply with appropriate standards, regulations, or requirements	Yes	Pipe conforms to AWWA Standards; water treatment components meet NSF 61 standards; and the use of components containing lead are not allowed.
(4)(a)12.	Color Coding of new or altered, aboveground piping at WTP	Yes	Complies with Ten States Standards
(4)(a)13.	Electrical Systems and Provisions for Standby Power	N/A	Standby Power per 62-555.320(14) is required for community water system serving, or designed to serve, 350 or more persons or 150 or more service connections.
(4)(a)14.	Operation and control strategies and instrumentation and control systems	N/A	No well sump pumps; no nitrate/nitrite removal equipment; no virus / Giardia lamblia inactivation requirements; no chlorine ton containers; and no standby power requirement
(4)(a)15.	Provisions for Metering and Sampling Finished Drinking	Yes	Existing finished water meter is provided
(4)(a)16.	Schematic diagram showing proper air gaps or mechanical backflow preventers, when needed	N/A	No air gaps or mechanical backflow preventers are proposed or needed
(4)(a)17.	Procedures for disinfecting, and conducting bacteriological surveys or evaluations	N/A	Carbon Dioxide gas system for pH buffering does not need disinfecting. Disinfection occurs after the filters.
(4)(a)18.	Procedures for keeping existing public water system components in operation	Yes	Sodium Hypochlorite Feed System can be installed "hot" and the WTP dose not need to be taken off line and disinfected.
(4)(a)19.	Description of drinking water additives and treatment chemicals	Yes	The operator shall purchase 19% Sodium Hypochlorite approved by NSF for use in drinking water.
(4)(b)	Drawings, specs & design data	Yes	Drawings, specifications & design data are sufficiently complete and detailed to determine compliance to rules

ENCLOSURES

- E-1 Application For A Specific Permit To Construct PWS Components
- E-2 Engineering Drawings ~ Process Flow Schematic & etc.
- E-3 Manufacturer's Cut Sheets of Gas Carbon Dioxide System
- E-4 Certification of Construction Completion and Request for Clearance to Place Permitted PWS Components into Operation

ENCLOSURE E-1

Application For A Specific Permit To Construct PWS Components



APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

See page 4 for instructions.

I. General Project Information

A. Name of Project: Orlando Utilities Commission Stanton Energy Center Water Treatment Plant Recarbonation

B. Description of Project and Its Purpose: The Stanton Energy center operates a 2000 gpm Water Treatment Plant. Raw water comes from two 1200 gpm wells which operate in a lag/lead basis. The raw water is pumped to an air stripper to remove hydrogen sulfide gases and then goes to a reactor/softener. The lime softened water then flows by gravity through dual sand and anthracite filters into a 75,000 gallon clearwell where it is also chlorinated for disinfection and residual. Water is pumped from the clearwell by two transfer pumps into a 500,000 gallon above ground storage tank. From the storage tank, the treated water is then pumped into the distribution system.

The plant desires to add a feed system that will allow the controlled addition of carbon dioxide gas into the lime softened water between the clarifier and before the gravity filters. The purpose of the project is to furnish and install the recarbonation system to control the pH of the finished water in the 8.0-8.5 range. The installation of the recarbonation system will improved the quality of the effluent water and will reduce the load the treated water puts on the demineralizers and polishers at the steam generation plant. This will result in higher quality make-up water to the steam generator and a reduction of the amounts of sulfuric acid and caustic required to regenerate the ion exchange resins necessary for high purity water.

C. Does project create a "new system" as described under subsection 62-555.525(1), F.A.C.? ☐ Yes, and a completed copy of Form 62-555.900(20), New Water System Capacity Development Financial and Managerial Operations Plan, is attached. ☒ No.

D. Location of Project

1. County Where Project Located: Orange

2. Description of Project Location: Orlando Utilities Commission Stanton Energy Center Potable Water Treatment Plant
5100 South Alafaya Tr., Orlando, FL 32831

3. Latitude and Longitude of Each New Treatment Plant and Each New Raw Water Source (attach additional sheets if necessary):

Name of New Treatment Plant or Raw Water Source	Latitude	Longitude
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W

E. Estimate of Cost to Construct Project: \$20,000

F. Estimate of Dates for Starting and Completing Construction of Project: _____

G. Applicant

PWS/Company Name: <u>Orlando Utilities Commission</u>		PWS Identification No.: <u>* 3484130</u>
PWS Type: ☐ Community ☒ Non-Transient Non-Community ☐ Transient Non-Community ☐ Consecutive		
Contact Person: <u>Alan Planeta</u>		Contact Person's Title: <u>Chemical Engineer</u>
Contact Person's Mailing Address: <u>Orlando Utilities Commission, P.O. Box 3193</u>		
City: <u>Orlando</u>	State: <u>FL</u>	Zip Code: <u>32802</u>
Contact Person's Telephone Number: <u>407-658-6444</u>		Contact Person's Fax Number: <u>407-244-8794</u>
Contact Person's E-Mail Address: <u>aplaneta@ouc.com</u>		

* This information is required only if the applicant is a public water system (PWS).

H. Public Water System (PWS) Supplying Water to Project

PWS Name: <u>Orlando Utilities Commission</u>		PWS Identification No.: <u>3484130</u>
PWS Type: ☐ Community ☒ Non-Transient Non-Community ☐ Transient Non-Community ☐ Consecutive		
PWS Owner: <u>Orlando Utilities Commission</u>		
Contact Person: <u>David Pope</u>		Contact Person's Title: <u>Lead Operator</u>
Contact Person's Mailing Address: <u>Orlando Utilities Commission, P.O. Box 3193</u>		
City: <u>Orlando</u>	State: <u>FL</u>	Zip Code: <u>32802</u>
Contact Person's Telephone Number: <u>407-658-6444</u>		Contact Person's Fax Number: <u>407-244-8794</u>
Contact Person's E-Mail Address: <u>dpope@ouc.com</u>		

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

Project Name: Orlando Utilities Commission Stanton Energy

Applicant: Orlando Utilities Commission

I. Public Water System (PWS) that Will Own Project After It Is Placed into Permanent Operation

PWS Name: Orlando Utilities Commission		PWS Identification No.: * 3484130	
PWS Type: * ☐ Community ☒ Non-Transient Non-Community ☐ Transient Non-Community ☐ Consecutive			
PWS Owner: Orlando Utilities Commission			
Contact Person: David Pope		Contact Person's Title: Lead Operator	
Contact Person's Mailing Address: Orlando Utilities Commission, P.O. Box 3193			
City: Orlando		State: FL	Zip Code: 32802
Contact Person's Telephone Number: 407-658-6444		Contact Person's Fax Number: 407-244-8794	
Contact Person's E-Mail Address: dpope@ouc.com			

* This information is required only if the owner/operator is an existing PWS.

J. Professional Engineer(s) or Other Person(s) in Responsible Charge of Designing Project*

Company Name:		
Designer(s):		Title(s) of Designer(s):
Qualifications of Designer(s):		
☐ Professional Engineer(s) Licensed in Florida – License Number(s): _____		
☐ Public Officer(s) Employed by State, County, Municipal, or Other Governmental Unit of State†		
☐ Plumbing Contractor(s) Licensed in Florida – License Number(s): ^		
Mailing Address of Designer(s):		
City:	State:	Zip Code:
Telephone Number of Designer(s):	Fax Number of Designer(s):	
E-Mail Address(es) of Designer(s):		

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers licensed in Florida.

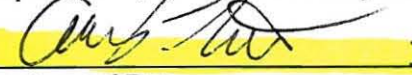
† Attach a detailed construction cost estimate showing that the cost to construct this project is \$10,000 or less.

^ Attach documentation showing that this project will be installed by the plumbing contractor(s) designing this project, documentation showing that this project involves a public water system serving a single property and fewer than 250 fixture units, and a detailed construction cost estimate showing that the cost to construct this project is \$50,000 or less.

II. Certifications

A. Certification by Applicant

I am duly authorized to sign this application on behalf of the applicant identified in Part I.G of this application. I certify that, to the best of my knowledge and belief, this project complies with Chapter 62-555, F.A.C., and provides assurance of compliance with Chapter 62-550, F.A.C. I also certify that construction of this project has not begun yet.

 Signature and Date	3/29/11 Printed or Typed Name	Alan Planeta Title
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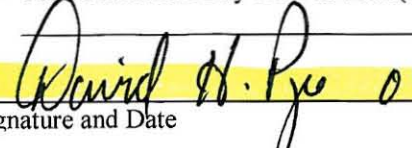
B. Certification by PWS Supplying Water to Project

I am duly authorized to sign this application on behalf of the PWS identified in Part I.H of this application. I certify that said PWS will supply the water necessary to meet the design water demands for this project. I certify that, to the best of my knowledge and belief, said PWS's connection to this project will not cause said PWS to be, or contribute to said PWS being, in noncompliance with Chapter 62-550 or 62-555, F.A.C. I also certify that said PWS has reviewed the preliminary design report or drawings, specifications, and design data for this project and that said PWS considers the connection(s) between this project and said PWS acceptable as designed.

• Name(s) of Water Treatment Plant(s) to Which this Project Will Be Connected: Orlando Utilities Commission Stanton Energy Center Water Treatment Plant

• Total Permitted Maximum Day Operating Capacity of Plant(s), gpd: 2,000,000

• Total Maximum Day Flow at Plant(s) as Recorded on Monthly Operating Reports During Past 12 Months, gpd: 1,074,000

 Signature and Date	04/04/2011 Printed or Typed Name	David H. Pope Title
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APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

Project Name: Orlando Utilities Commission Stanton Energy

Applicant: Orlando Utilities Commission

C. Certification by PWS that Will Own Project After It Is Placed into Permanent Operation

I am duly authorized to sign this application on behalf of the PWS identified in Part I.I of this application. I certify that said PWS will own this project after it is placed into permanent operation. I also certify that said PWS has reviewed the preliminary design report or drawings, specifications, and design data for this project and that said PWS considers this project acceptable as designed.

David H. Pope 04/06/2011
Signature and Date

David H. Pope

Printed or Typed Name

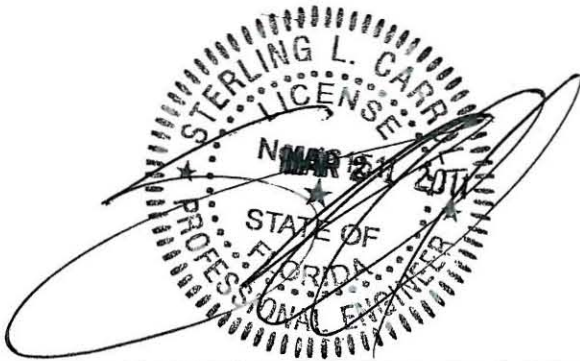
Lead Operator

Title

D. Certification by Professional Engineer(s) in Responsible Charge of Designing Project*

I, the undersigned professional engineer licensed in Florida, am in responsible charge of preparing the preliminary design report or drawings, specifications, and design data for this project. I certify that, to the best of my knowledge and belief, the design of this project complies with Chapter 62-555, F.A.C., and provides assurance of compliance with Chapter 62-550, F.A.C.

Signature, Seal, and Date:



Printed/Typed Name:

License Number:

Portion of Engineering Document(s) for Which Responsible:

Signature, Seal, and Date:

Printed/Typed Name:

License Number:

Portion of Engineering Document(s) for Which Responsible:

Signature, Seal, and Date:

Printed/Typed Name:

License Number:

Portion of Engineering Document(s) for Which Responsible:

Signature, Seal, and Date:

Printed/Typed Name:

License Number:

Portion of Engineering Document(s) for Which Responsible:

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers (PEs) licensed in Florida. If this project is being designed under the responsible charge of one or more PEs licensed in Florida, Part II.D of this application shall be completed by the PE(s) in responsible charge. If this project is not being designed under the responsible charge of one or more PEs licensed in Florida, Part II.D does not have to be completed.

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

INSTRUCTIONS: This application shall be completed and submitted by persons proposing to construct or alter public water system components unless such proposed construction or alteration is permitted under the Department of Environmental Protection's (DEP's) "General Permit for Construction of Water Main Extensions for Public Water Systems," in which case Form 62-555.900(7) is to be completed and submitted, or under the DEP's "General Permit for Construction of Lead or Copper Corrosion Control, or Iron or Manganese Sequestration, Treatment Facilities for Small or Medium Public Water Systems," in which case Form 62-555.900(18) is to be completed and submitted. Complete and submit one copy of this application to the appropriate DEP District Office or Approved County Health Department (ACHD) along with payment of the proper application processing fee and one copy of the following information:

- either a preliminary design report or drawings, specifications, and design data (the preliminary design report or drawings, specifications, and design data shall contain all pertinent information required under subsection 62-555.520(4), F.A.C.); and
- the Florida Public Service Commission (FPSC) certificate of authorization to provide water service if the project involves construction of a new public water system subject to the jurisdiction of the FPSC.

All information provided on this application shall be typed or printed in ink. Application processing fees are listed in paragraph 62-4.050(4)(n), F.A.C. Checks for application processing fees shall be made payable to the Department of Environmental Protection or to the appropriate ACHD. Preliminary design reports, drawings, specifications, and design data prepared under the responsible charge of one or more professional engineers licensed in Florida shall be signed, sealed, and dated by the professional engineer(s) in responsible charge. NOTE THAT A SEPARATE APPLICATION AND A SEPARATE APPLICATION PROCESSING FEE ARE REQUIRED FOR EACH NON-CONTIGUOUS PROJECT.*

** Non-contiguous projects are projects that are neither interconnected nor located nearby one another (i.e., on the same site, on adjacent streets, or in the same neighborhood).*

ENCLOSURE E-2

Engineering Drawings ~ Process Flow Schematic & etc.



ENCLOSURE E-3

Manufacturer's Cut Sheets of Gas Carbon Dioxide System

3008 Regulators

Special Purpose Regulators –
Electrically Heated

Single Stage Chrome-Plated Brass Barstock Body, 316L Stainless Steel Diaphragm, Electrically Heated for Carbon Dioxide and Nitrous Oxide

The 3008 Series regulators are specially designed to prevent freeze-up problems associated with high flows of carbon dioxide and nitrous oxide.

Typical Applications

- Chemical storage blanketing
- Anaerobic chambers
- Inert gas purging
- Atomic absorption oxidizer gas
- Semiconductor reactor furnace
- Inductively coupled plasma systems
- Ph control



Features and Benefits

- Chrome-Plated Brass Barstock Body
Smooth surface finish
- Single 200 Watt Heater
Maintains gas flow rate up to 350 scfh
- Two Stage Design
Prevents dry ice build-up
- 316L Stainless Steel Diaphragm
Unaffected by temperature or outboard diffusion
- Low Wetted Surface Area
Minimal purge requirements
- Convoluted Diaphragm
Smooth pressure adjustment

Specifications

- Maximum Inlet Pressure
3000 psig (210 bar)
- Thermostat Temperature Range
90 °F to 125 °F, ± 8 °F
(35 °C to 48 °C)
- Heater
1 @ 200 watts
(110 or 220 VAC)
- Ports
1/4" FNPT
- Gauges
2" diameter chrome-plated brass
- Helium Leak Integrity
1 x 10⁻⁸ cc/sec
- Cv
0.15
- Weight
6.8 lb

Materials

- Body
Chrome-plated brass barstock
- Bonnet
Chrome-plated die cast
- Seat
PTFE Teflon®
- Filter
10 micron
- Diaphragm
316 stainless steel
- Internal Seals
PTFE Teflon®

Ordering Information — Series PRS3008ABCD-CGA

Highlighted selection indicates most popular model

A	B	C	D	CGA
Outlet Pressure	Outlet Gauge	Inlet Gauge	Assembly/Gauges	Inlet Connections
1: 0-15 psig	0-30 psig	0: None	0: 110 VAC Bare	CGA
2: 0-30 psig	0-60 psig	3: 0-4000 psig	1: 110 VAC (psi/kPa Gauges)	
3: 0-50 psig	0-100 psig		2: 220 VAC Bar Body	
5: 0-100 psig	0-200 psig		3: 220 VAC (psi/kPa Gauges)	
		0: 1/4" FNPT Port	4: 110 VAC (bar/psi Gauges)	
		1: 1/4" MNPT	5: 220 VAC (bar/psi Gauges)	
		2: 1/4" Tube Fitting		
		3: Diaphragm Valve 1/4" Tube Fitting		
		4: Diaphragm Valve 1/4" MNPT		
		5: Needle Valve 1/4" MNPT		
		6: 1/8" Tube Fitting		

Option	Part Number	Description
Protocol Station	Add Letter "M" after CGA	See page 40 for details
Protocol Switchover Station	Add Letter "C" after CGA	See page 41 for details
Protocol Switchover Station with Alarm	Add Letter "G" after CGA	See page 42 for details
Protocol Alarm Station	Add Letter "A" after CGA	See page 42 for details
Deep Purge	Add Letter "D" after CGA	See page 37 for details

3394

Allen C7WY3
Air gas
407-849-0630
510 11347

ASCO[®] Red-Hat[®] Series 8030

2-Way Low Pressure Solenoid Valves

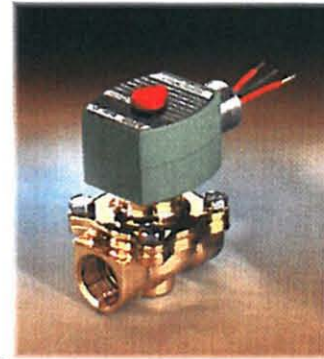


- Direct Acting, Brass or Stainless Steel Bodies.
- 3/8" to 3/4" NPT, No Minimum Pressure Required.
- Low Pressures: Up to 15 PSI Maximum Differential.
- These ASCO Valves widely used for dispensing, collating, gas shutoff, vacuum holding, and tank draining applications.
- Normally Open valve well suited for venting systems.

Normally Closed (Closed when de-energized)								
Pipe Size	Orifice Size	Cv	Operating Pressure Differential (PSI)				Brass Body	Stainless Steel Body
			Max. AC		Max. DC		Catalog Number	Catalog Number
			Air-Gas	Water	Air-Gas	Water		
3/8"	3/8"	1.8	7	5	3	3	8030G10	8030G64
3/8"	3/8"	1.8	15	15	3.5	3.5	8030G13	8030G65
1/2"	7/16"	2.8	4	6	-	-	8030G16	8030G66
1/2"	7/16"	2.8	15	15	-	-	8030G17	8030G67
3/4"	3/4"	5	2	2	1	1	8030G3	-
3/4"	3/4"	5	4	4	-	-	8030G43	-
3/4"	5/8"	5.4	2.5	2.5	-	-	-	8030G63
Normally Open (Open when de-energized)								
3/8"	3/8"	1.6	15	15	-	-	8030G70	-
1/2"	7/16"	2.2	15	15	-	-	8030G71	-

1/2"	3/4"	5	2	2	-	-	8030G82	-
3/4"	3/4"	5.5	2	2	-	-	8030G83	-

Approvals: CSA Certified. UL Listed. FM Approved (Normally Closed only except



8030G17 and 8030G67). Meets applicable CE directives.

VALVATE ASSOCIATES

15925 Minnesota Ave., Paramount, CA 90723

(562) 633-4300 - (714) 761-3644

FAX: (562) 630-2345

sales@valvate.com

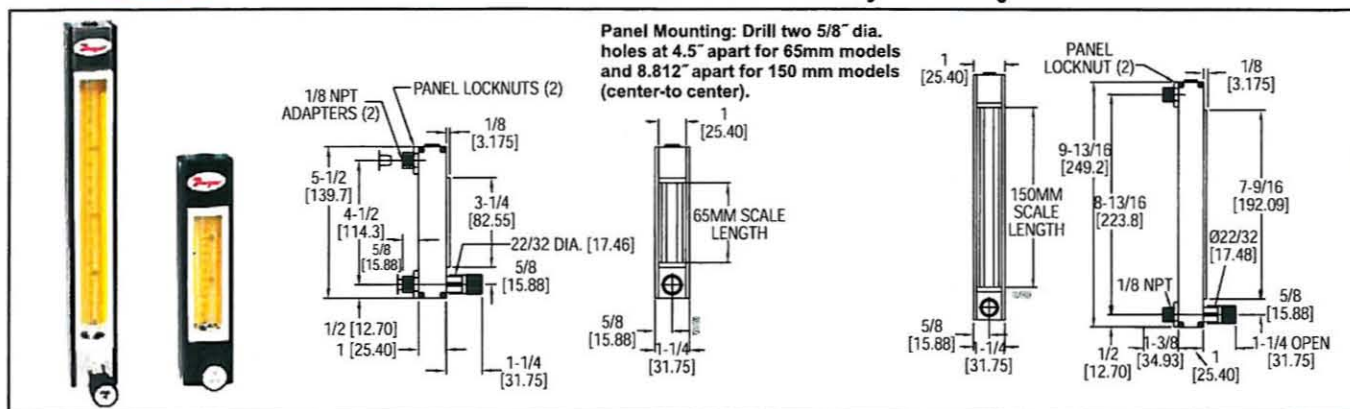
[Home](#) - [Contact Us](#) - [ASCO Red Hat](#) - [ASCO Tri-Point](#) - [ASCO Pneumatic](#) - [ASCO General Controls](#)
[Hays](#) - [Kunkle](#) - [Magnatrol](#) - [Plast-O-Matic](#) - [Dwyer](#) - [W.E. Anderson](#) - [United Brass](#) - [Solenoid Valves](#)
[2-Way Valves](#) - [3-Way Valves](#) - [4-Way Valves](#) - [Air-Operated Valves](#) - [Combustion Valves](#)
[Steam/Hot Water Valves](#) - [Vacuum Service Valves](#) - [Cryogenic Valves](#) - [Multipol Valves](#)
[Intrinsically Safe Valves](#) - [Direct-Mount Pilot Valves](#) - [Low Power Valves](#) - [Manual Reset Valves](#)
[Long Life/Rapid Cycling Valves](#) - [Harsh Environment 3-Way Valves](#) - [Timer Drain Valves](#)
[Proportional Valves](#) - [Valve Position Indicators](#) - [Micro Miniature Valves](#) - [Pressure/Temperature Switches](#)
[Filters](#) - [Regulators](#) - [Lubricators](#) - [Safety and Relief Valves](#) - [Control Valves](#) - [Pulse Meters](#)
[Multi-Jet Cold/Hot Water Meters](#) - [Turbine Meters](#) - [Insertion Meters](#) - [Check Valves](#) - [Steam Traps](#)
[Brass Ball Valves](#) - [SS Ball Valves](#) - [Globe/Angle Body Valves](#) - [Needle Valves](#) - [Gate Valves](#)
[Brass Fittings](#) - [Reducing/Regulating Valves](#) - [Sight Flow Indicators](#)
[Strainers](#) - [Butterfly Valves](#) - [Flow Controls](#) - [Flow Switches](#) - [Gages](#) - [Flowmeters](#) - [Manometers](#)
[Level Switches](#) - [Flow Switches](#) - [Pressure Transmitters](#) - [Proximity Sensors](#)



Series
DR

Direct Reading Glass Flowmeters

65 mm and 150 mm, $\pm 5\%$ FS Accuracy, Interchangeable Flowtubes



Use Series DR Glass Flowmeters to accurately measure flow rates of air or water with the convenience of a direct reading scale. Permanently fused ceramic scale has integral float guides for optimum float performance. Reflective plastic background and 1.5 X magnification lens reduces eye fatigue and allows for more accurate readings. Units include a safety blow-out back panel for additional protection. Flowmeters are shipped completely assembled and include standard panel mounting hardware for quick installation.

SPECIFICATIONS

Service: Compatible gases or liquids.

Wetting Materials:

Flowtube: Borosilicate glass.

Float: 316 SS (black glass as indicated).

Float Stops: PTFE.

End Fittings: Anodized Aluminum or 316 SS.

O-rings: Buna-N on aluminum models and Fluoroelastomer on stainless steel models.

Temperature Limit: 250°F (121°C).

Pressure Limit: 250 psig (17 bar).

Accuracy: $\pm 5\%$ FS @ 70°F (21.1°C) and 14.7 psia (1 atm absolute).

Repeatability: $\pm 0.25\%$ of scale reading.

Scales: Direct reading 65 mm or 150 mm scales for air or water.

Turn-down Ratio: 10:1.

Connection: 1/8" female NPT.

Mounting: Vertical.

Valve: 6-turn needle (standard on models with valve).

APPLICATIONS

Glass flowmeters are suitable for metering gases or liquids for film processing, paper manufacturing, chemical processing, semiconductor industry, water and air pollution analysis equipment, metals processing, industrial fuel and energy conservation, cylinder gas metering, and general laboratory and industrial applications.

Add suffix "M" for metric scale.

* Denotes glass float.

† Metric models use ccm as unit of measure.

Model (65 mm scale)					
Without Valve		With Valve		Flow Rate (Air)	Flow Rate (H2O)
Aluminum	SS	Aluminum	SS		
DR10010*	DR12010*	DR10410*	DR12410*	0.24 (130†)	—
DR10022	DR12022	DR10422	DR12422	0.65 (300†)	—
DR10030*	DR12030*	DR10430*	DR12430*	1.1 (500†)	—
DR10042	DR12042	DR10442	DR12442	2.2 (1000†)	—
				scfh (sccm)	gph (sccm)
DR10062	DR12062	DR10462	DR12462	4.4 (2.1)	—
DR10070*	DR12070*	DR10470*	DR12470*	11 (5)	—
DR10082	DR12082	DR10482	DR12482	20 (9.5)	—
DR10090*	DR12090*	DR10490*	DR12490*	55 (24)	—
DR100102	DR120102	DR104102	DR124102	100 (50)	—
DR100120*	DR120120*	DR104120*	DR124120*	—	0.02 (1.5)
DR100132	DR120132	DR104132	DR124132	—	0.1 (6.5)
DR100140*	DR120140*	DR104140*	DR124140*	—	0.13 (8)
DR100152	DR120152	DR104152	DR124152	—	0.36 (24)
DR100172	DR120172	DR104172	DR124172	—	0.9 (55)
DR100180*	DR120180*	DR104180*	DR124180*	—	2.2 (140)
DR100192	DR120192	DR104192	DR124192	—	4.4 (280)
DR100200*	DR120200*	DR104200*	DR124200*	—	10 (600)
DR100212	DR120212	DR104212	DR124212	—	24 (1500)

Model (150 mm scale)					
Without Valve		With Valve		Flow Rate (Air)	Flow Rate (H2O)
Aluminum	SS	Aluminum	SS		
DR20032	DR22032	DR20432	DR22432	0.33 (160)	—
DR20082	DR22082	DR20482	DR22482	0.54 (270)	—
DR200132	DR220132	DR204132	DR224132	2 (840)	—
				scfh (LPM)	
DR200182	DR220182	DR204182	DR224182	3.8 (1.8)	—
DR200232	DR220232	DR204232	DR224232	10 (4.8)	—
DR200282	DR220282	DR204282	DR224282	16 (7.5)	—
DR200332	DR220332	DR204332	DR224332	35 (16)	—
DR200382	DR220382	DR204382	DR224382	90 (44)	—
DR200432	DR220432	DR204432	DR224432	—	0.05 (3.2)
DR200482	DR220482	DR204482	DR224482	—	0.075 (4.6)
DR200532	DR220532	DR204532	DR224532	—	0.34 (21)
DR200582	DR220582	DR204582	DR224582	—	0.75 (46)
DR200632	DR220632	DR204632	DR224632	—	2.2 (140)
DR200682	DR220682	DR204682	DR224682	—	3.6 (230)
DR200732	DR220732	DR204732	DR224732	—	7.5 (480)
DR200782	DR220782	DR204782	DR224782	—	21 (1300)



CRYOGENICS & CARBON DIOXIDE

BULK & DEWAR STORAGE OF PURE GAS IN LIQUID FORM

Liquid Gas Emergency Response Guides:

Argon UN1951, Guide #120
Carbon Dioxide UN2187, Guide #120
Helium UN1963, Guide #120
Nitrogen, UN1977, Guide #120
Oxygen UN1073, Guide #122



Cryogenic Liquid

A liquid having a normal boiling point below -200°F

1 gallon of liquid Argon	equals	112.50 cubic feet of gas
1 gallon of liquid Carbon Dioxide	equals	74.04 cubic feet of gas
1 gallon of liquid Helium	equals	100.74 cubic feet of gas
1 gallon of liquid Nitrogen	equals	93.11 cubic feet of gas
1 gallon of liquid Oxygen	equals	115.10 cubic feet of gas

DEWAR Fill Prices

Description (Gas Type)	Part No.	Fill Ea
Argon:		
Liquid Withdraw	XLAr-4500L	\$224.00
Standard Pressure	XLAr-4500S	\$224.00
High Pressure	XLAr-4500H	\$224.00
Carbon Dioxide:	CO2-DWR	Call
Helium:	LHe-DWR	Call
Nitrogen:		
Liquid Withdraw	XLN2-LS160L	\$80.00
Standard Pressure	XLN2-LS160S	\$80.00
High Pressure	XLN2-LS160H	\$80.00
Oxygen, Aviators/Laser:		
Standard Pressure	LABO-4500S	Call
High Pressure	LABO-4500H	Call
Oxygen, Technical:		
Standard Pressure	LO2-4500S	Call
High Pressure	LO2-4500H	Call

COMMON DEWARs
contain about the same amount of gas as 16 to 20 large high pressure cylinders

How is Liquid Oxygen, Nitrogen & Argon produced & Stored?

Air is taken out of the atmosphere, filtered, then the Carbon Dioxide is removed. This clean air is then chilled. The chilling continues until each primary element, within the air, turns into a liquid state. Nitrogen, Oxygen & Argon each convert at a different temperature. Each liquid goes on for further cleaning. The 3 finished cryogenic products are stored separately in large storage vessels. These insulated vessels are like giant thermos bottles, and aid in the effort to try and minimize the loss that occurs when the liquid product warms up and flashes back into a gas. This product, even though it is insulated, continually flashes off. Therefore long term storage is impossible. This is also part of the consideration when deciding whether to acquire liquid product stored & dispensed from a Dewar, or to procure gas in pressurized cylinders. Gas in pressurized cylinders can last indefinitely. A Dewar slowly releases gas, if it is unused, completely emptying itself in about 2 weeks.

For Dewar Rentals: See Cylinder Services Page

Bulk Cryogenic (Type II) & Carbon Dioxide

Call if you don't have a storage vessel, we can assist you.

BULK DELIVERY TO PORTABLE OR PERMANENT STORAGE TANKS



Description (Gas Type)	Part No.	Price
Argon:		
Minimum fill	LAr-BULK	Call
Bulk	LAr-BULK	Call
Carbon Dioxide:		
Minimum fill	CO2-BULK	Call
Bulk	CO2-BULK	Call
Nitrogen:		
Minimum fill	LN2-BULK	Call
Bulk	LN2-BULK	Call
Oxygen, Aviators:		
Minimum fill	LABO-BULK	Call
Bulk	LABO-BULK	Call
Oxygen, Technical:		
Minimum fill	LO2-BULK	Call
Bulk	LO2-BULK	Call

On-Site Conversion of Liquid Nitrogen to Gaseous Nitrogen
Up to 22,000 Cubic Feet per Delivery

Part No.	Price Per Delivery
N2-SUB	\$2,495.00

X at the beginning of Stoody gas number means that the gas is under current contract and includes all standard storage and delivery costs.

**MATERIAL SAFETY DATA SHEET**

PRODUCT NAME: CARBON DIOXIDE, GAS

1. Chemical Product and Company Identification

BOC Gases,
Division of
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974

TELEPHONE NUMBER: (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300

BOC Gases
Division of
BOC Canada Limited
5975 Falbourn Street, Unit 2
Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER:
(905) 501-0802
EMERGENCY RESPONSE PLAN NO: 20101

PRODUCT NAME: CARBON DIOXIDE, GAS
CHEMICAL NAME: Carbon Dioxide
COMMON NAMES/SYNONYMS: Carbonic Anhydride
TDG (Canada) CLASSIFICATION: 2.2
WHMIS CLASSIFICATION: A

PREPARED BY: Loss Control (908)464-8100/(905)501-1700

PREPARATION DATE: 6/1/95

REVIEW DATES: 6/7/96

2. Composition, Information on Ingredients

INGREDIENT	% VOLUME	PEL-OSHA ¹	TLV-ACGIH ²	LD ₅₀ or LC ₅₀ Route/Species
Carbon Dioxide FORMULA: CO ₂ CAS: 124-38-9 RTECS #: FF6400000	99.8 TO 99.999	5000 ppm TWA	5000 ppm TWA 30,000 ppm STEL	Not Available

¹ As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

² As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

3. Hazards Identification**EMERGENCY OVERVIEW**

Oxygen levels below 19.5% may cause asphyxia. Carbon dioxide exposure can cause nausea and respiratory problems. High concentrations may cause vasodilation leading to circulatory collapse.

PRODUCT NAME: CARBON DIOXIDE, GAS

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion Yes
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HEALTH EFFECTS:

Exposure Limits Yes	Irritant No	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:

No adverse effects anticipated.

SKIN EFFECTS:

No adverse effects anticipated.

INGESTION EFFECTS:

No adverse effects anticipated.

INHALATION EFFECTS:

Carbon dioxide is the most powerful cerebral vasodilator known. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Asphyxiation is likely to occur before the effects of carbon dioxide overexposure. Chronic, harmful effects are not known from repeated inhalation of low concentrations. Low concentrations of carbon dioxide cause increased respiration and headache.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

NFPA HAZARD CODES

Health: 1
Flammability: 0
Reactivity: 0

HMIS HAZARD CODES

Health: 1
Flammability: 0
Reactivity: 0

RATINGS SYSTEM

0 = No Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard

PRODUCT NAME: CARBON DIOXIDE, GAS

4. First Aid Measures

EYES:

Never introduce oil or ointment into the eyes without medical advice! If pain is present, refer the victim to an ophthalmologist for further treatment and follow up.

SKIN:

No adverse effects anticipated.

INGESTION:

Not anticipated.

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON DIOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None		UEL(%): None
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS:

None. Nonflammable

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical Classification:

Non-Hazardous

PRODUCT NAME: CARBON DIOXIDE, GAS

Dry carbon dioxide can be handled in most common structural materials. Moist carbon dioxide is generally corrosive by its formation of carbonic acid. For applications with moist Carbon Dioxide, 316, 309 and 310 stainless steels may be used as well as Hastelloy ® A, B, & C, and Monel ®. Ferrous Nickel alloys are slightly susceptible to corrosion. At normal temperatures carbon dioxide is compatible with most plastics and elastomers.

Use only in well-ventilated areas. Carbon dioxide vapor is heavier than air and will accumulate in low areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the system.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

Maximum use for potable water 100 mg/l.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Carbon Dioxide FORMULA: CO ₂ CAS: 124-38-9 RTECS #: FF6400000	99.8 TO 99.999	5000 ppm TWA	5000 ppm TWA 30,000 ppm STEL	Not Available

¹ Refer to individual state of provincial regulations, as applicable, for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

³ As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

IDLH (Carbon Dioxide): 50,000 ppm

ENGINEERING CONTROLS:

Use local exhaust to prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 19.5% and the carbon dioxide concentration below the exposure limit.

EYE/FACE PROTECTION:

Safety goggles or glasses as appropriate for the job.

SKIN PROTECTION:

Protective gloves of any material appropriate for the job.

RESPIRATORY PROTECTION:

MSDS: G-8

Revised: 6/7/96

PRODUCT NAME: CARBON DIOXIDE, GAS

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:

Safety shoes.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70 °F	: 856	psia
Vapor density at 70 °F, 1 atm (Air = 1)	: 1.53	
Evaporation point	: Not Available	
Boiling point (CO2 Sublimes)	: -109.3	°F
	: -78.5	°C
Freezing point	: -69.8	°F
	: -56.6	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Very soluble	
Odor threshold	: Not Applicable	
Odor and appearance	: A colorless, odorless gas.	

10. Stability and Reactivity

STABILITY:

Stable

INCOMPATIBLE MATERIALS:

Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diammino may ignite. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon monoxide and oxygen when heated above 3092 °F (1700°C). Carbonic acid is formed in the presence of moisture.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. Toxicological Information

REPRODUCTIVE:

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

Exposure of female rats to 60,000 ppm carbon dioxide for 24 hours has produced toxic effects to the embryo and fetus in pregnant rats. Toxic effects to the reproductive system have been observed in other mammalian species at similar concentrations.

OTHER:

MSDS: G-8

Revised: 6/7/96

PRODUCT NAME: CARBON DIOXIDE, GAS

Carbon dioxide is the most powerful cerebral vasodilator known. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Chronic, harmful effects are not known from repeated inhalation of low (3 to 5 molar %) concentrations.

12. Ecological Information

No data given.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Carbon Dioxide	Carbon Dioxide
HAZARD CLASS:	2.2	2.2
IDENTIFICATION NUMBER:	UN 1013	UN 1013
SHIPPING LABEL:	NONFLAMMABLE GAS	NONFLAMMABLE GAS

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III HAZARD CLASSES:

Acute Health Hazard

Sudden Release of Pressure Hazard

PRODUCT NAME: CARBON DIOXIDE, GAS

16. Other Information

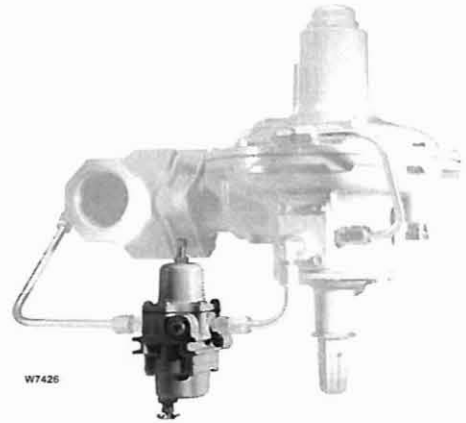
Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

67CF Series Filter Regulators

- ☆ Compact and Light Weight
- ☆ Designed for Digital Instrumentation
- ☆ No Air Loss
- ☆ Easy Maintenance



A 67CF Series regulator used as a pilot supply regulator for the Type 299 pressure regulator



A 67CF Series filter regulator shown with optional pressure gauge



A 67CF Series regulator used as a supply regulator for digital instrumentation

- ☆ High Performance
- ☆ Integral Filter
- ☆ Internal Relief Valve
- ☆ Rugged Construction

Bulletin 71.1:67CF

Introduction

The 67CF Series regulators are typically used to provide constantly controlled, reduced pressures to pneumatic and electropneumatic controllers and other instruments. These direct-operated regulators are suitable for most air or gas applications. Other applications include providing reduced pressures to air chucks, air jets, and spray guns.

Features

- **Compact**—The 67CF Series regulators are engineered for outstanding performance in a compact, light-weight package.
- **Internal Relief**—The Type 67CFR has an internal relief valve with a soft seat for reliable shutoff with no discernible leakage.
- **Panel Mounting**—Panel mount construction includes spring case with 1/4-inch NPT vent, handwheel adjusting screw, and mounting nut.
- **Instrument Supply Regulator**—Provides a clean air supply to a variety of pneumatic and electro-pneumatic instrumentation.
- **Digital Instrument Supply Regulator**—Designed for the accuracy, repeatability, and hysteresis demands of digital instrumentation.
- **Pilot Supply Regulator**—Improves the accuracy of two-path control regulators by reducing inlet sensitivity caused by fluctuating inlet pressures.
- **Pressure Loading Regulator**—Provides high accuracy and improved performance in dirty steam service by eliminating the need for a pilot regulator (see figure 2).
- **Sour Gas Service Capability**—NACE (MR0175) compliant construction available.
- **Integral Filter**—An integral filter ensures clean downstream air supply.
- **Ease of Maintenance**—No special tools are required to perform maintenance, and all maintenance can be performed with the regulator in the line. Filter elements are easily replaced. The one-piece valve plug cartridge allows easy inspection and replacement.

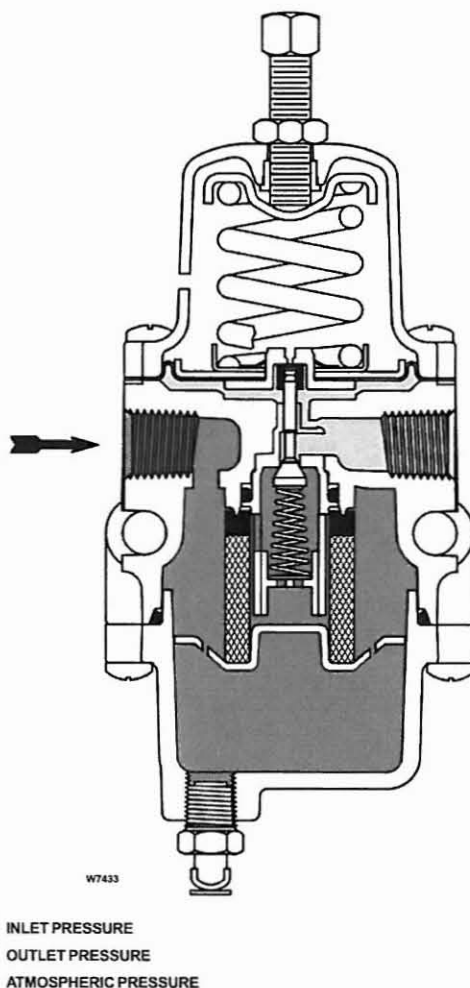


Figure 2. 67CF Series Regulator Operational Schematic

- **Rugged Construction**—The 67CF Series regulators are engineered for longer service life with minimal maintenance requirements.
- **Second Outlet**—Body side outlet for pressure gauge or other uses.
- **Powder Paint Coating**—Fisher products are powder paint coated, offering impact, abrasion, and corrosion resistance.
- **Corrosion Resistant Fasteners**—Adjusting screw and screws are double zinc-chromated for enhanced corrosion resistance.
- **Full Usable Capacity**—Fisher regulators are laboratory tested. 100 percent of the published capacities can be used with confidence.

Specifications

Body Size, Inlet and Outlets Connection Style

1/4-inch NPT screwed

Maximum Inlet Pressure (Body Rating)⁽¹⁾

250 psig (17,2 bar)

Outlet Pressure Ranges

OUTLET PRESSURE RANGES, PSIG (bar)	CONTROL SPRING DATA		
	Part Number	Color	Wire Diameter, Inch (mm)
0 to 20 (0 to 1,4)	T14130T0012	green stripe	0.135 (3,43)
0 to 35 (0 to 2,4)	T14059T0012	silver	0.156 (3,96)
0 to 60 (0 to 4,1)	T14058T0012	blue stripe	0.170 (4,32)
0 to 125 (0 to 8,6)	T14060T0012	red stripe	0.207 (5,26)

Maximum Emergency Outlet Pressure⁽¹⁾

50 psi (3,4 bar) over outlet pressure setting

Capacities

See table 1

Wide-Open Flow Coefficients

Main Valve: C_g : 11.7; C_v : 0.36; C_f : 32.2

Internal Relief Valve: C_g : 1.45; C_v : 0.045; C_f : 32.8

Pressure Registration

Internal

Accuracy

Inlet Sensitivity: Less than 0.2 psig (0,014 bar) change in outlet pressure for every 25 psig (1,72 bar) change in inlet pressure

Repeatability: 0.1 psig (0,0069 bar)⁽²⁾

Air Consumption: testing repeatedly shows no discernible leakage

Type 67CFR Internal Relief Performance

Low capacity for minor seat leakage only; other overpressure protection must be provided if inlet pressure can exceed the maximum pressure rating of downstream equipment or exceeds maximum outlet pressure rating of the Type 67CFR

Filter Capabilities

Free Area: 12 times pipe area

Micron Rating:

Cellulose Element: 40 microns

Glass Fiber Element: 10 microns

Stainless Steel Element: 40 microns

Regulator Temperature Capabilities

With Nitrile (NBR):

-40° to 180°F (-40° to 82°C)

With Fluoroelastomer (FKM):

0° to 300°F (-18° to 149°C)

With Silicone (VMQ)⁽³⁾:

-60° to 180°F (-51° to 82°C)

Drain Valve and Spring Case Vent Location

Aligned with inlet standard, other positions optional

Approximate Unit Weight

1 pound (0,5 kg)

Construction Materials

Body, Spring Case and Dripwell: Aluminum (ASTM B85/Alloy 380)

Pusher Post: Polyester resin

Upper Spring Seat: Zinc-plated steel

Diaphragm Plate: Zinc-plated steel

Adjusting Screw: Zinc-plated steel

Filter Retainer: Zinc-plated steel

Valve Plug: Brass stem with nitrile (NBR) plug (standard); aluminum stem with nitrile (NBR) or fluoroelastomer (FKM) plug; or stainless steel stem with nitrile (NBR) or fluoroelastomer (FKM) plug (optional)

Soft Seat: Nitrile (NBR) (standard), or fluoroelastomer (FKM) (optional)

Diaphragm and O-Rings: Nitrile (NBR) (standard), fluoroelastomer (FKM), or silicone (VMQ) (optional)

Control Spring: Plated steel (standard) or Inconel (for 67CFR NACE)

Valve Spring: Stainless steel (standard) or Inconel (NACE)

Drain Valve: Brass (standard), aluminum, or stainless steel (optional)

Filter Element: Cellulose (standard), glass fiber, or stainless steel (optional)

Options

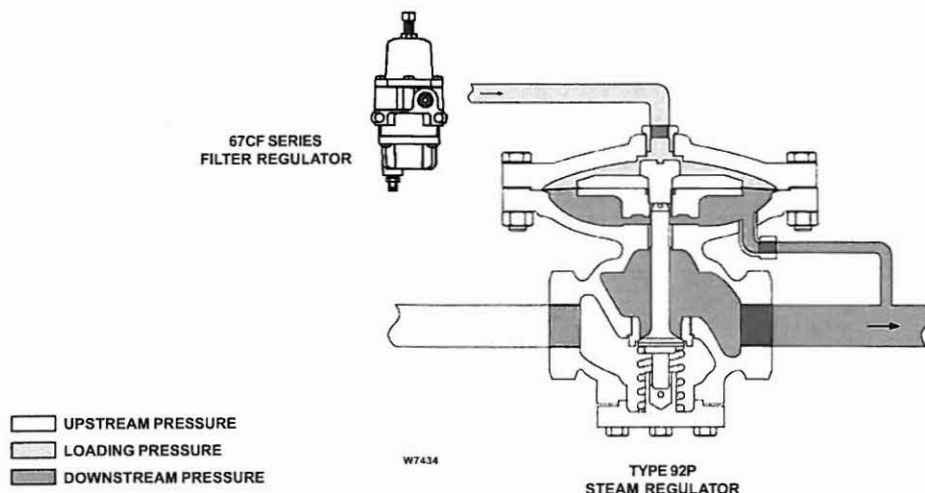
- Handwheel adjusting screw
- NACE construction
- Ammonia service construction
- Panel mount (includes spring case with 1/4-inch vent, handwheel, and panel mounting nut)
- Closing cap (available on spring case with 1/4-inch NPT vent)
- Aluminum or stainless steel drain valve
- Fluoroelastomer (FKM) elastomers for high temperatures and/or corrosive chemicals
- Silicone (VMQ) elastomers for cold temperatures
- Triple scale outlet pressure gauge (brass or stainless steel)
- Stainless steel stem on the valve plug
- Fixed bleed restriction mounted in the side outlet
- Tire valve in second outlet
- Pipe plug in second outlet

1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation should not be exceeded.

2. Repeatability is the measure of the regulator's ability to return to setpoint consistently when traveling from steady state to transient to steady state.

3. Silicone is not compatible with hydrocarbon gas.

Bulletin 71.1:67CF



A 67CF SERIES PRESSURE LOADING REGULATOR USED WITH THE TYPE 92P STEAM REGULATOR ELIMINATES THE NEED FOR A PILOT REGULATOR. THIS PROVIDES HIGH ACCURACY AND IMPROVED PERFORMANCE IN DIRTY STEAM SERVICE.

Figure 3. 67CF Series Regulator Used to Pressure Load a 92P Steam Regulator

Capacity Information

Table 1 shows the air regulating capacities of the 67CF Series regulators at selected inlet pressures and outlet pressure settings. Flows are shown in scfh (at 60°F and 14.7 psia) and in m³/h(n) (at 0°C and 1,01325 bar) of air.

Note

The 67CF Series regulators may be sized for 100% flow using capacities as shown in table 1. It is not necessary to reduce published capacities.

To determine the equivalent capacities for other gases, multiply the table capacity by the following appropriate conversion factor: 1.29 for 0.6 specific gravity natural gas, 0.810 for propane, 0.707 for butane, or 1.018 for nitrogen. For gases of other specific gravities, divide the table capacities by the square root of the appropriate specific gravity.

To find wide-open flow capacities for relief sizing at any inlet pressure, perform one of the following procedures. Then, if necessary, convert using the factors provided above.

For critical pressure drops (absolute outlet pressure equal to or less than one-half of absolute inlet pressure), use the following formula:

$$Q = (P_1)(C_g)$$

where,

Q = gas flow rate, scfh
P₁ = absolute inlet pressure, psia
(P₁ gauge + 14.7)

For pressure drops lower than critical (absolute outlet pressure greater than one-half of absolute inlet pressure), use the following formula:

$$Q = \sqrt{\frac{520}{GT}} C_g P_1 \sin \left(\frac{3417}{C_1} \sqrt{\frac{\Delta P}{P_1}} \right) \text{ DEG}$$

where,

Q = gas flow rate, scfh
G = specific gravity of the gas
T = absolute temperature of gas at inlet, °Rankine
C_g = gas sizing coefficient
P₁ = absolute inlet pressure, psia
C₁ = flow coefficient (C_g ÷ C_v)
ΔP = pressure drop across the regulator, psi

Then, if capacity is desired in normal cubic meters per hour (at 0°C and 1,01325 bar), multiply scfh by 0.0268.

Table 1. Capacities

OUTLET PRESSURE RANGE, SPRING PART NUMBER AND COLOR, PSIG (bar)	OUTLET PRESSURE, PSIG (bar)	INLET PRESSURE, PSIG (bar)	CAPACITIES IN SCFH (m ³ /h(n)) OF AIR	
			10% Droop	20% Droop
0 to 35 (0 to 2,4) T14059T0012 Silver	15 (1,0)	50 (3,4)	250 (6,7)	430 (11,5)
		75 (5,2)	300 (8,0)	690 (18,5)
		100 (6,9)	330 (8,8)	1150 (30,8)
		150 (10,3)	400 (10,7)	1600 (42,9)
		250 (17,2)	450 (12,1)	1800 (48,2)
	20 (1,4)	50 (3,4)	350 (9,4)	500 (13,4)
		75 (5,2)	530 (14,2)	820 (22,0)
		100 (6,9)	750 (20,1)	1300 (34,8)
		150 (10,3)	1850 (49,6)	1850 (49,6)
	35 (2,4)	250 (17,2)	2800 (75,0)	3000 (80,4)
		50 (3,4)	400 (10,7)	620 (16,6)
		75 (5,2)	600 (16,1)	980 (26,3)
		100 (6,9)	840 (22,5)	1300 (34,8)
		150 (10,3)	1850 (49,6)	1850 (49,6)
		250 (17,2)	3000 (80,4)	3000 (80,4)
0 to 60 (0 to 4,1) T14058T0012 Blue stripe	35 (2,4)	50 (3,4)	370 (9,9)	560 (15,0)
		75 (5,2)	540 (14,5)	940 (25,2)
		100 (6,9)	760 (20,4)	1300 (34,8)
		150 (10,3)	1360 (36,4)	1850 (49,6)
		250 (17,2)	3000 (80,4)	3000 (80,4)
	60 (4,1)	75 (5,2)	570 (15,3)	830 (22,2)
	60 (4,1)	100 (6,9)	830 (22,2)	1220 (32,7)
		150 (10,3)	1450 (38,9)	1850 (49,6)
		250 (17,2)	2900 (77,7)	3000 (80,4)
		250 (17,2)	2900 (77,7)	3000 (80,4)
0 to 125 (0 to 8,6) T14060T0012 Red stripe	80 (5,5)	100 (6,9)	600 (16,1)	870 (23,3)
		150 (10,3)	880 (23,6)	1320 (35,4)
		250 (17,2)	1400 (37,5)	2500 (67)
	125 (8,6)	150 (10,3)	960 (25,7)	1400 (37,5)
		250 (17,2)	1700 (45,6)	2580 (69,1)

Overpressure Protection

The 67CF Series regulators have maximum outlet pressure ratings that are lower than their maximum inlet pressure ratings. A pressure relieving or pressure limiting device is needed if inlet pressure can exceed the maximum outlet pressure rating.

Refer to the Capacity Information section and the relief sizing coefficient in the specifications table to determine the required relief valve capacity.

The Type 67CFR regulator has a low capacity internal relief valve for minor seat leakage only. Other overpressure protection must be provided if the maximum

inlet pressure can exceed the maximum pressure rating of the downstream equipment or exceeds maximum outlet pressure rating of the Type 67CFR regulator.

Ordering Information

When ordering, complete the Ordering Guide on page 8. Refer to the Specifications on page 2. Review the description to the right of each specification and the information in each referenced table or figure. Specify your choice whenever a selection is offered.

Bulletin 71.1:67CF

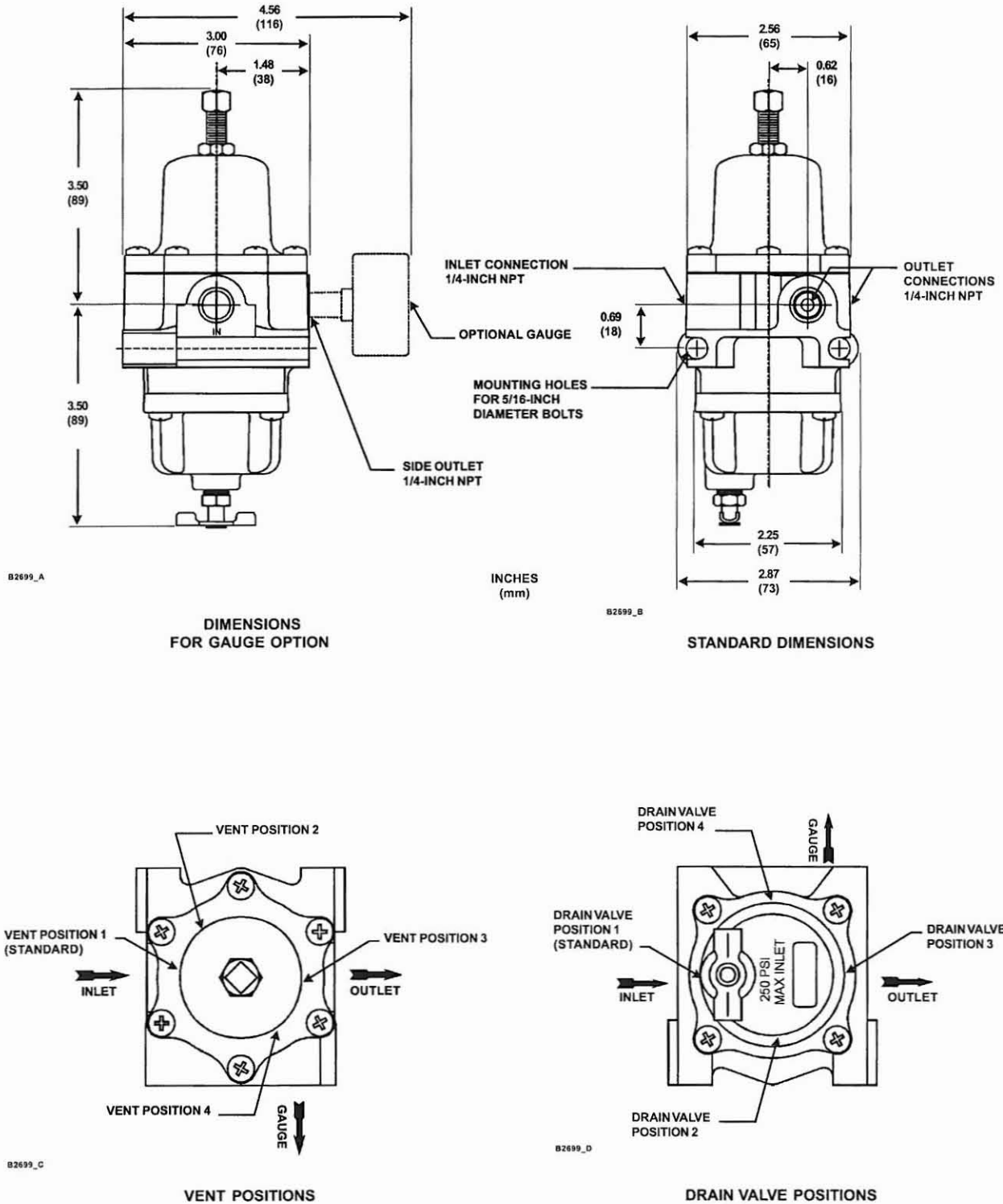


Figure 4. Dimensions

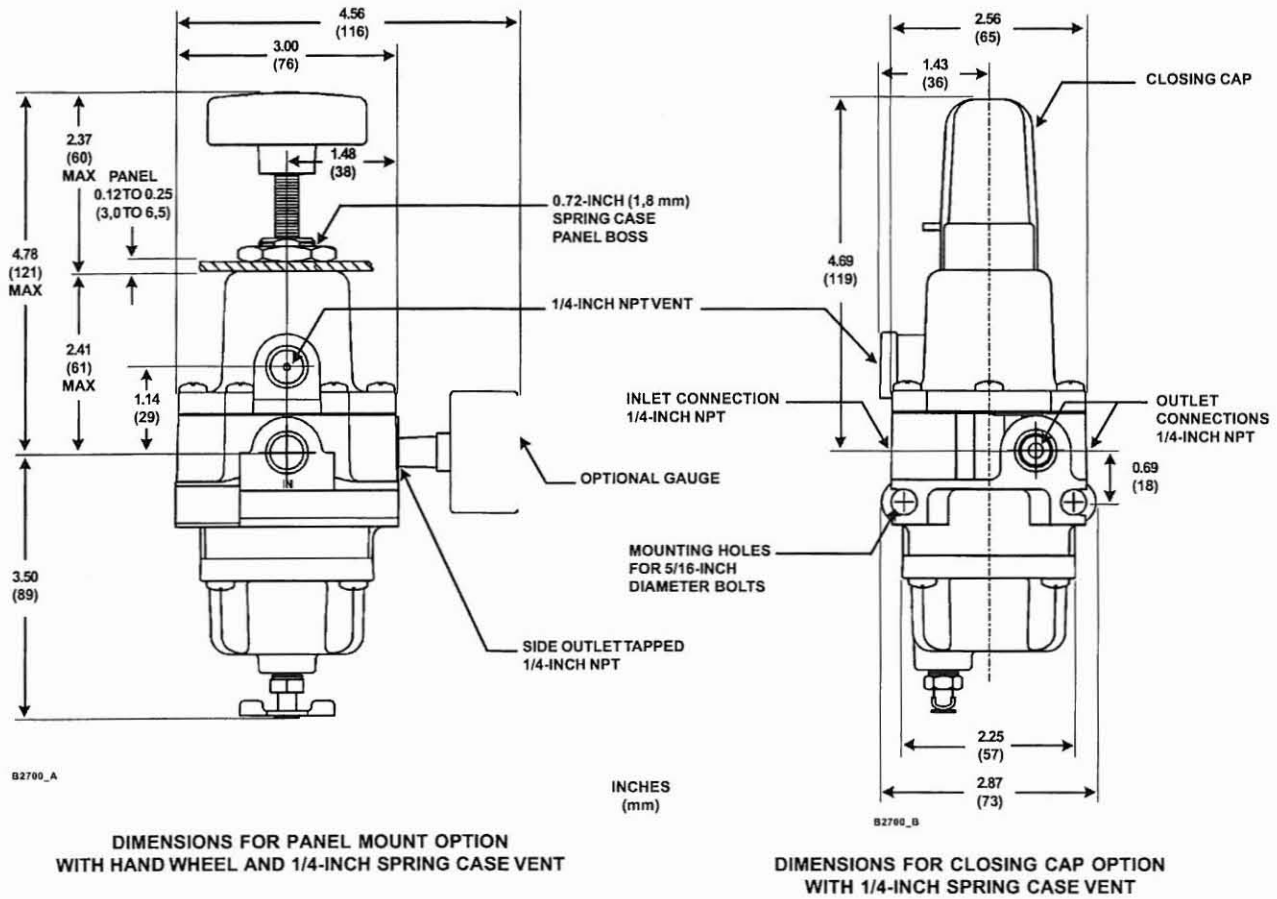


Figure 4. Dimensions (continued)

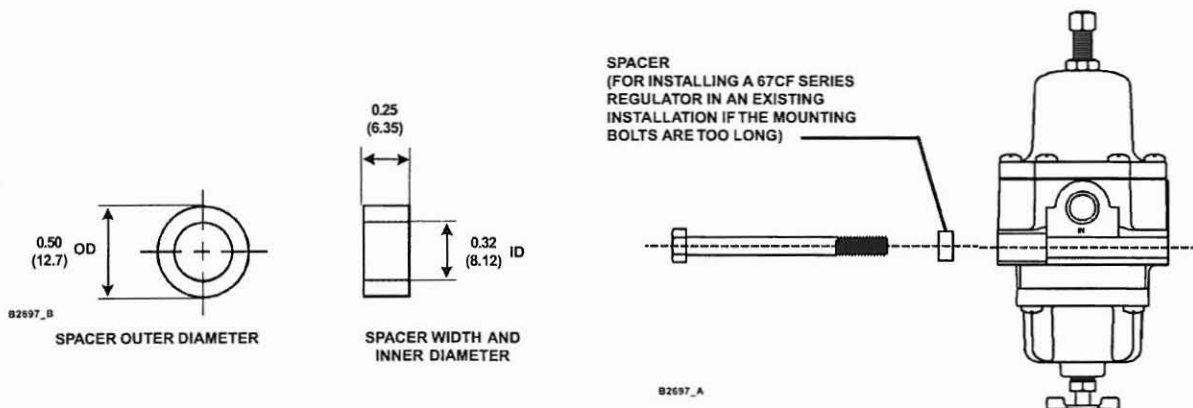


Figure 5. Spacer Dimensions and Installation Schematic

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Ordering Guide

Type (Select One)

- ☐ Type 67CF (without internal relief)***
- ☐ Type 67CFR (with internal relief)***

Quantity (Specify)

Spring Case Style (Select One)

- ☐ Standard with drilled hole vent***
- ☐ Handwheel adjusting screw***
- ☐ Panel mount (includes 1/4-inch spring case vent, handwheel adjusting screw, and mounting nut)***
- ☐ Closing cap and 1/4-inch NPT spring case vent***

Outlet Pressure Range (Select One)

- ☐ 0 to 20 psig (0 to 1,4 bar) (not available for NACE)***
- ☐ 0 to 35 psig (0 to 2,4 bar)***
- ☐ 0 to 60 psig (0 to 4,1 bar)***
- ☐ 0 to 125 psig (0 to 8,6 bar)***

Diaphragm, O-Rings, and Valve Plug (Select One)

- ☐ Nitrile (NBR) (standard)***
- ☐ Fluoroelastomer (FKM)**
- ☐ Silicone (VMQ) diaphragm, O-rings, and nitrile valve plug*

Filter Material (Select One)

- ☐ Cellulose (40 microns) (standard)***
- ☐ Glass (10 microns)***
- ☐ Stainless steel (40 microns)***

Drain Valve (Select One)

- ☐ Brass (standard)***
- ☐ Aluminum***
- ☐ Stainless steel***

Drain Valve Location (Select One)

- ☐ Position 1 - Aligned with inlet (standard)***
- ☐ Position 2
- ☐ Position 3
- ☐ Position 4

Spring Case Vent Location (Select One)

- ☐ Position 1 - Aligned with inlet (standard)***
- ☐ Position 2
- ☐ Position 3
- ☐ Position 4

Second Outlet (Select One)

- ☐ Open (standard)***
- ☐ Plugged with pipe plug***
- ☐ Tire Valve***
- ☐ Pressure Gauge (see below)

Triple Scale Pressure Gauge (Optional)

Brass Gauge

- ☐ 0 to 30 psig/0 to 0.2 MPa/0 to 2 bar***
- ☐ 0 to 60 psig/0 to 0.4 MPa/0 to 4 bar***
- ☐ 0 to 160 psig/0 to 1.1 MPa/0 to 11 bar***

Stainless Steel Gauge

- ☐ 0 to 30 psig/0 to 0.2 MPa/0 to 2 bar***
- ☐ 0 to 60 psig/0 to 0.4 MPa/0 to 4 bar***
- ☐ 0 to 160 psig/0 to 1.1 MPa/0 to 11 bar***

NACE (MR0175) Construction (Optional)

- ☐ Yes**

Ammonia Service Construction (Optional)

- ☐ Yes**

Replacement Parts Kit (Optional)

- ☐ Yes, send one replacement parts kit to match this order.

Fisher Regulators Quick Order Guide	
***	Standard - Readily Available for Shipment
**	Non-Standard - Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult Your Fisher Sales Representative for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Specification Worksheet	
Application (Please designate units):	
Specific Use	_____
Line Size	_____
Gas Type and Specific Gravity	_____
Gas Temperature	_____
Does the Application Require Overpressure Protection?	
☐ No ☐ Yes, if so, which is preferred:	
☐ Relief Valve ☐ Monitor Regulator ☐ Shutoff Device	
Is overpressure protection equipment selection assistance desired?	

Pressure (Please designate units):	
Maximum Inlet Pressure (P_{1max})	_____
Minimum Inlet Pressure (P_{1min})	_____
Downstream Pressure Setting(s) (P_2)	_____
Maximum Flow (Q_{max})	_____
Performance Required:	
Accuracy Requirements?	_____
Need for Extremely Fast Response?	_____
Other Requirements:	

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For information, contact Fisher Controls:

Marshalltown, Iowa 50158 USA
28320 Gallardon, France
Sao Paulo 05424 Brazil
Singapore 128461

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