

BIOGAS CONTROL AND SAFETY SYSTEMS OVERVIEW

Anaerobic Digesters
Landfill Gas Applications
Biogas/Methane Utilization
Agricultural Applications
Food & Beverage



Groth Corporation has the products and services to meet your needs from cover and gas control equipment to burners and flares.

Groth Corporation is a global provider of high quality Biogas safety and recovery products. Biogas products protect property, the environment and life from fire and explosion and reduce emissions into the atmosphere safely. Groth Corporation offers a wide range of Biogas safety and control equipment.

Biogas is produced during the biological breakdown of organic solids through anaerobic digestion. The gas resulting from this process is an energy source that can be collected and utilized or safely burned.

Recovered Biogas can be used in many ways:

- Run generators to produce electricity
- Run boilers to heat the anaerobic digester or the treatment facility
- Eliminate natural gas and propane usage for cost savings and profit

Anaerobic digestion is a very safe and effective way of treating biosolids from municipal and industrial wastewater. It is ideal for meeting strict environmental regulations, especially with emission standards becoming more stringent in urban areas.

The anaerobic process takes place in digesters (closed tanks), covered ponds or lagoons by the use of a thermophilic or mesophilic process. Landfills also generate Biogas naturally as buried organic refuse biodegrades.

ANAEROBIC DIGESTION

Historically, anaerobic digestion had been used at only municipal sewage treatment facilities. Today, anaerobic digestion is heavily used to treat wastes from distilleries, agriculture (e.g. dairy, swine, and poultry farms) breweries, food processing, and other industrial sites. We have the equipment and expertise to meet the needs of these as well as other industries. Whether you have an anaerobic digester, lagoon, covered pond or landfill, Groth Corporation has the products and services to meet your needs from cover and gas control equipment to burners and flares.

THE BIOGAS SYSTEM

Biogas collection and utilization are important to the anaerobic digestion process. The gas is saturated and contains elements harmful to people as well as corrosive to piping and equipment. It is important for the Biogas handling equipment to be of high quality and operate as a system.

EQUIPMENT

Moisture and Sediment

Biogas is saturated when it leaves the digester, covered pond or lagoon. In order to avoid damage to downstream equipment, moisture and sediment should be removed. A Condensate and Sediment Trap with drip trap should be located immediately downstream of the digester, covered pond or lagoon. A condensate accumulator should be considered when an accumulation of condensate is expected. This will help lower operating and maintenance costs.

Foam

Foam in the digester can clog gas handling equipment. The following is recommended to address this problem:

- Pressure and vacuum relief valves with flame arresters are installed on digester covers. When foam clogs the flame arresters, it may prevent the pressure and vacuum relief valves from properly relieving pressure or vacuum accumulation which could cause damage to digesters and the digester roof. Emergency pressure or vacuum relief can be accomplished by installing emergency relief valves.
- Installing a foam separator immediately downstream of the digester will prevent foam from entering downstream of the digesters.

Flames

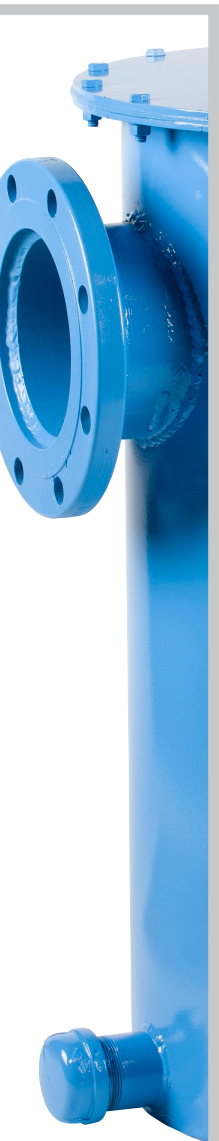
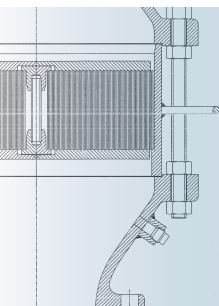
Flame arresters should be installed between ignition sources and vital equipment. In addition, thermal shut-off valves should be used along with all in-line arresters. Flame arresters should be installed along with all pressure and vacuum relief valves on the digester roof to prevent external flames from igniting gas inside the tank.

Gas

Regulators will direct the gas to utilization equipment such as boilers and engine generators and may be located upstream or downstream depending on specifications. Check valves should be located where a reversal of flow would damage rotating equipment or disrupt the system's pressure balance. Biogas can become explosive within flammable concentrations of gas and air.

FLAME FLASHBACKS

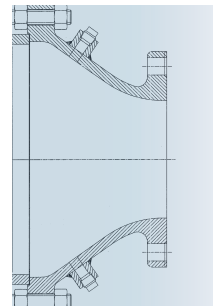
Flame flashbacks can occur within the Biogas piping system and can severely damage equipment.



EXPLOSIONS

Specific equipment must be installed to prevent the possibility of explosion.

- Flame arresters must be installed as close to the source of ignition as possible.
- A flame arrester should be installed by a source of air such as by relief valves and vents or where there is an open flame or chance of sparking.
- Check local building codes, OSHA standards, and fire protection codes when determining where to locate waste gas burners or enclosed flares.
- All vent lines should terminate outside the building when diaphragm-operated valves, manometers, and other equipment might vent gas when installed indoors.
- Pressure and vacuum relief valves, flame arresters, and drip traps should be inspected on a regular basis to ensure proper operation. Conducting periodic maintenance is required to maximize efficient performance.



EMERGENCY RELIEF

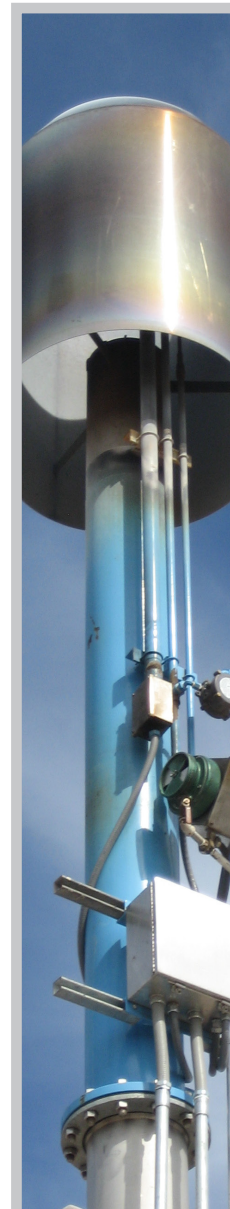
A Biogas system should have two methods of relieving excess to the atmosphere:

➤ Flares

A waste gas burner is used to safely combust Biogas and reduce odors.

➤ Pressure/Vacuum Relief Valves

Pressure and vacuum relief valves should be installed on the digester cover or Biogas holder. A minimum of two pressure/vacuum relief valves with flame arresters are recommended along with a Safety Selector Valve. The Safety Selector Valve enables isolating one set of equipment while performing maintenance on the other set.



FIELD SERVICE

Due to the safety hazards inherent with Biogas, Groth Corporation provides field services to help ensure the safe and efficient operation of your Biogas system.

Site Surveys

Groth Corporation experts will conduct a survey of your Biogas system and report results regarding:

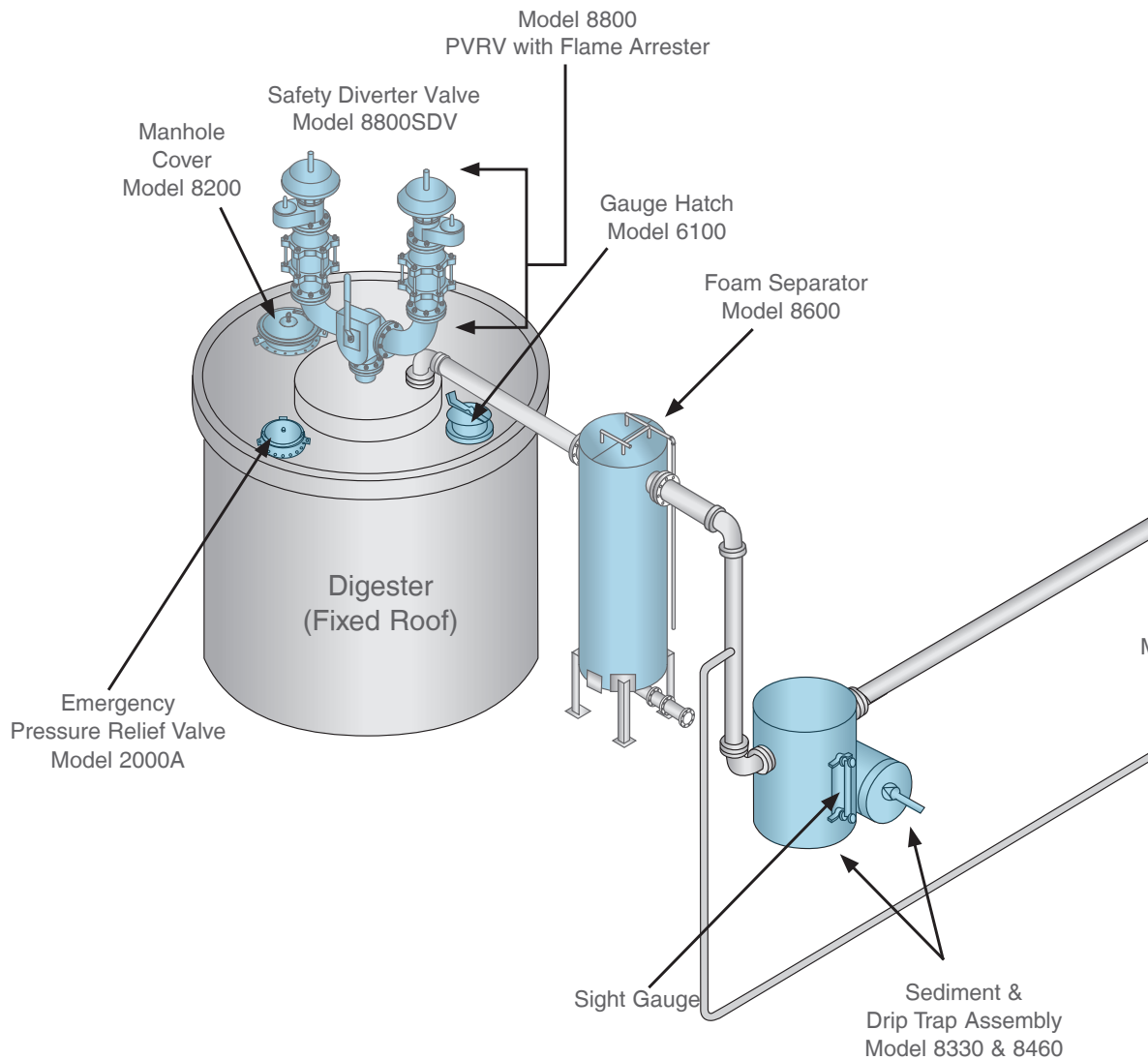
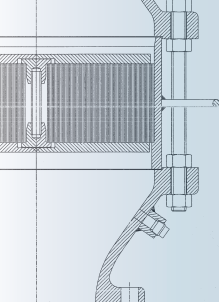
- System design
- Identify causes for existing operation problems
- Recommended solutions

Start-up and Training Services

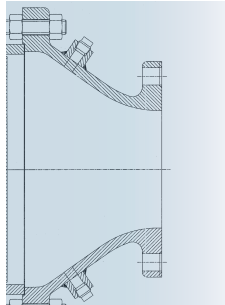
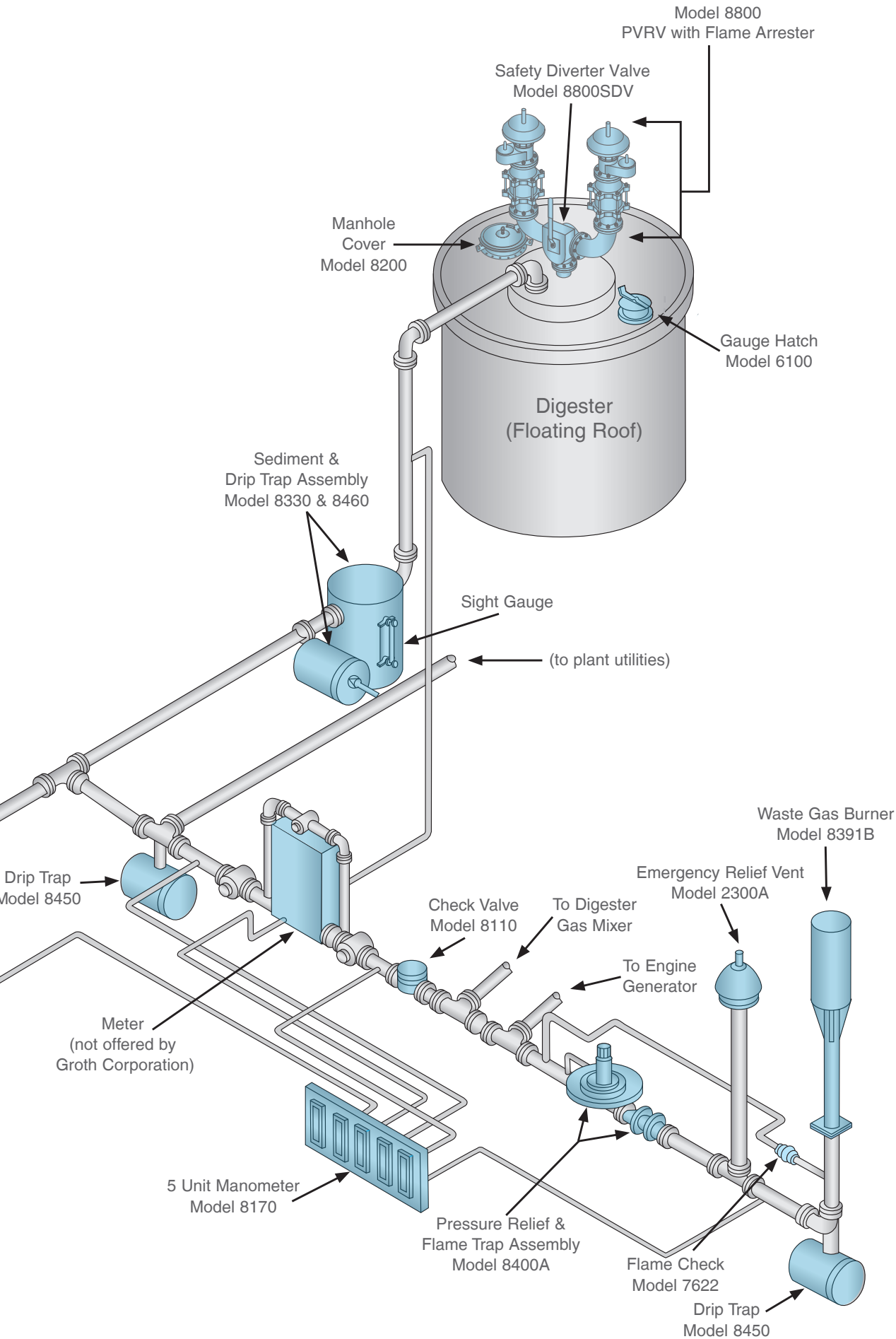
Groth Corporation experts will assist with equipment start-up and conduct training on the proper care, operation and required preventive maintenance. This training is conducted in both the classroom and in the field and includes guidelines for future preventative maintenance to keep your Biogas system operating smoothly and efficiently.

TYPICAL FLOW AND INSTALLATION DIAGRAM

This schematic is for general presentation purposes only and is not intended to represent a specific design. Please consult the Groth Corporation Biogas catalog or visit www.grothcorp.com for complete product information.



SHOWING A MULTIPLE DIGESTER GAS SYSTEM



For specific performance characteristics of these products, please see the Groth Wastewater Biogas Catalog

DIGESTER COVER EQUIPMENT



Model 880OSDV

Safety Diverter Valve

- Provides a quick and easy way for valve changeover
- Allows a no-interruption process
- Easy and safe maintenance with no down time



Models 8800A & 8820A

Pressure Relief & Vacuum Breaker Valve with Flame Arrester

- Protects tank from damage created by overpressure or excessive vacuum
- Provides protection from externally caused sources of heat & ignition
- Proven spiral wound, crimped ribbon flame element



Model 7618 // Vertical Model 7628 // Horizontal Flame Arresters

- Units designed for quick and easy cleaning and maintenance
- Protects the system from externally caused sources of heat and ignition for increased fire protection and safety



Model 8200

Roof Manhole Cover

- Non-sparking and gas-tight
- Provides quick and easy access
- Uniform surface seating
- Limited maintenance required

Model 6100

Sample and Gauge Hatch

- Assures uniform seating
- Incorporates a positive cover lockdown to assure a tight seal



For specific performance characteristics of these products, please see the Groth Wastewater Biogas Catalog

GAS SAFETY AND CONTROL EQUIPMENT



Model 8330 // Sediment Trap Model 8331 // Condensate Accumulator

- Removes excess water and sediment
- Quick and easy cleaning is facilitated by removing top cover
- Available with flanged connections as standard
- Drip trap and sight glass attach quickly
- Optional high and low level alarm switches



Model 8600

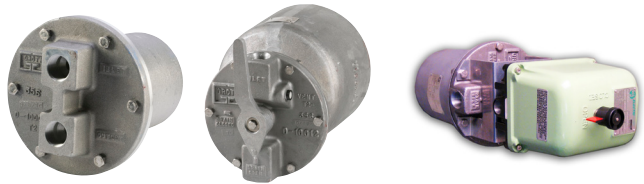
Foam Separator

- Eliminates foam
- Removes particles
- Continuous water spray systems
- High and low level alarms

For specific performance characteristics of these products, please see the Groth Wastewater Biogas Catalog

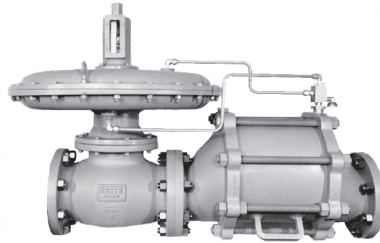


GAS SAFETY AND CONTROL EQUIPMENT



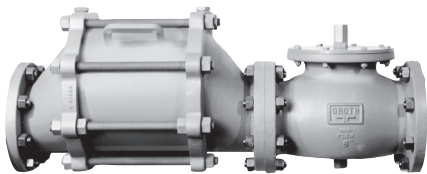
Model 8450 // Automatic
Model 8460 // Manual
Model 8490 // Electrically Actuated
Drip Traps

- Provides safe removal of liquids from the low point in gas control line
- Designed for quick opening and maintenance
- Easily attaches to Groth Corporation sediment trap for extra efficiency



Model 8400A
Pressure Relief & Flame Trap Assembly

- Maintains upstream pressure, allowing only surplus gas to flow downstream
- Field adjustable set pressure
- Integral thermal valve stops gas flow when flashback is sensed at the flame arrester
- Easy to maintain



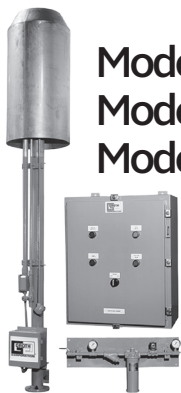
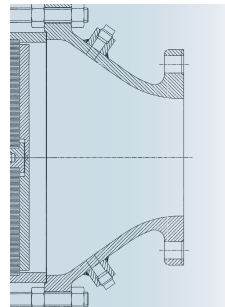
Model 8500A
Flame Trap Assembly

- Unit protects against flame propagation into upstream piping
- Unit composed of horizontal flame arrester and thermal operated shut-off valve
- Valve has low temperature fusible type element to shut off flow in event of a flashback
- Element may be replaced without disassembly of valve



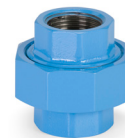
Model 2300A
Pressure Relief Vent

- Corrosion-resistant construction
- Self-closing air cushion pallet with center stabilizing stem and peripheral guidance provides uniform seating and alignment



Model 8391B // Waste Gas Burner
Model 8392B // Flame Front Generated Ignition
Model 8393B // Fully Enclosed

- Includes an automatic ignition system
- Reliable downdraft prevention for wind protection
- Provides proper air/fuel mixture to ensure efficient burn
- Wind shield controls outside winds up to 150 mph and operates efficiently in heavy rain
- Flame retention vortex vanes vastly improve burning efficiency
- Quick, easy maintenance



Model 7622
Flame Check

- Easy disassembly to replace or clean screens
- High flow capacity
- Element of perforated plates provide minimum pressure drop and still prevent flashbacks in pilot lines



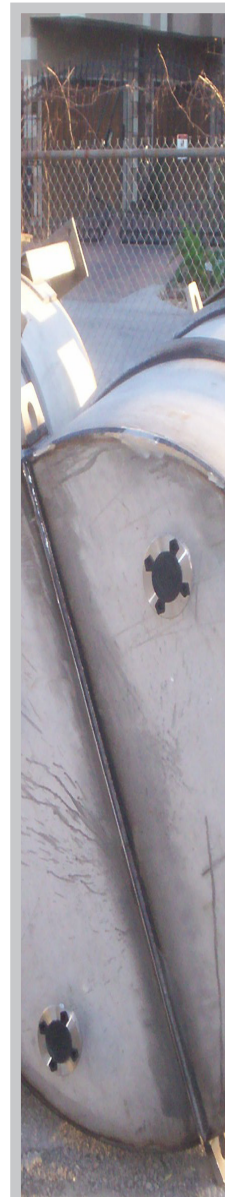
Model 8170
Manometer

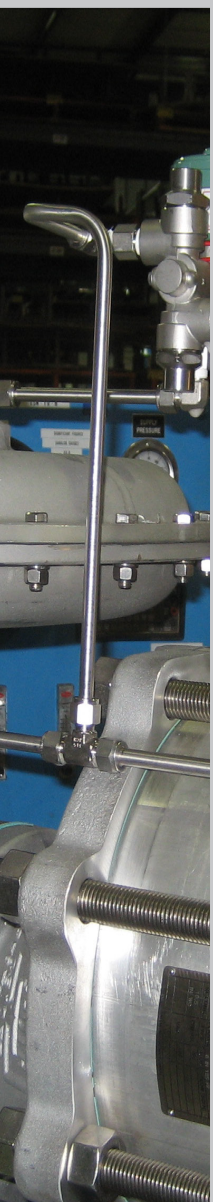
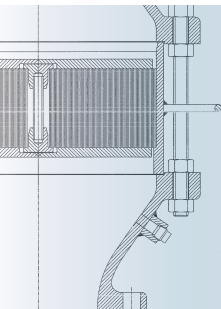
- Solid acrylic assembly with shatter-proof tube and scale protect against dust, dirt and rain
- Any number of tubes may be mounted side-by-side
- Long-lasting and designed for easy cleaning and maintenance



Model 8110

- Back Pressure Check Valve**
- Allows full flow with low working pressure
 - Easy maintenance by quickly removing cover and replacing pallet
 - Variety of materials available
 - Flanged connection standard





GROTH
CORPORATION
a Continental Disc company

SMART RELIEF...SAFE SOLUTIONSSM

All Groth manufacturing facilities are ISO 9001 approved.



The products in this catalog may qualify for some, none or all of these certifications:



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