



Anderson Greenwood
Types 9300 & 9300H

- Full bodied valves to pipe away the discharge, types 9300 & 9300H are fully balanced against back-pressure.
- The modular concept allows them to be used in the pilot operated pressure relief mode and simultaneously provides vacuum relief, either via weight load or with a specific vacuum pilot.
- They can also be used for pressure only (blocked on vacuum) or vacuum only (blocked on pressure).
- The 9300H version has been optimized for very large flows, providing economical reduction in size of valves and piping, or in the number of valves required for large storage tanks, onshore and offshore.
- Each size has been flow tested and certified.
- Field Test Connection, and complete scope of accessories and configurations.



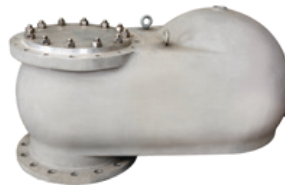
Anderson Greenwood
Type 93

- The type 93 pilot operated pressure relief valve is designed with elastomer seats and seals for accurate and reliable low pressure protection in petrochemical and chemical processes and storage tanks.
- If required, the fully modulating pilot can easily be adjusted to pop action.
- Elastomer seats and seals.
- Elastomer or PTFE diaphragms.
- Pressure protection only.
- Field Test Connection, and complete scope of accessories and configurations.



Anderson Greenwood
Type 9200

- The type 9200 operates like the 9300 but discharges directly to atmosphere and has no provision to be piped away.
- Its vent configuration provides enhanced flow capacities.
- PTFE & FEP seat, seals and diaphragms.
- Aluminium or stainless steel construction.
- Field Test Connection, and complete scope of accessories and configurations.



Anderson Greenwood
Type 96A

- The 96A is a weight loaded vacuum breaker designed to complement pressure relief products, especially when seeing high positive operating pressure.
- Its enhanced seat design provides premium tightness very close to the opening point.
- The internal flow path has been optimized to provide the largest flow capacities.



Anderson Greenwood
Type MLCP

- Modulating Large Capacity Pilot safety valve designed for low pressure gas and vapour service.
- The internal pressure sensing and integrated pilot makes it a very compact, simple, high performance and cost effective valve.
- Internal pressure sensing.
- FKM soft seats and seals.
- Full bore orifices for maximum flow.
- Field test connection as standard.

Low Pressure and Tank Protection



EMERSON

**ANDERSON
GREENWOOD**

ENARDO

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FISHER

Sources:



*Emerson Product Brochure:
Pressure Relief Valves
Product Overview*

LOW PRESSURE PILOT OPERATED

TANK PROTECTION



**ANDERSON GREENWOOD
SERIES MLCP
PRESSURE RELIEF VALVE**

Modulating Large Capacity Pilot Valve designed for gas and vapor service. Internally sensed pilot operated pressure relief valve in a simple, high performance, cost effective design.



**VAREC 2010B/2020B SERIES
WEIGHT LOADED PRESSURE AND
VACUUM RELIEF VALVE**

Protects tanks from damage or deformation, minimizes emissions to the environment, as well as loss of product due to evaporation. Designed for use on atmospheric and low pressure storage tanks. Vent to atmosphere or pipe away models.



**VAREC 3500B/3600B/3650B SERIES
WEIGHT LOADED VACUUM RELIEF
VALVE**

Designed to protect liquid storage vessels, vapor recovery systems and process systems from excessive vacuum. Designs available for tank top mounting, side mounting as well as for "in-line" applications.



**VAREC 7100B SERIES
WEIGHT LOADED PRESSURE
RELIEF VENT**

Pressure relief valve designed to protect atmospheric and low pressure storage tanks from being overpressured. Air cushion seating design keeps the valve tightly sealed until the pressure inside the tank approaches the valve setting. Vent to atmosphere design.



**VAREC 2440/2450 SERIES
SPRING LOADED PRESSURE AND
VACUUM RELIEF VALVE**

Designed for use on liquid storage tanks, vessels and vapor recovery systems where excess pressure or vacuum may cause damage or permanent deformation and leakage of product must be minimized. Vent to atmosphere or pipe away models.



**VAREC 4110A/3610/3660 SERIES
SPRING LOADED VACUUM RELIEF
VALVE**

Designed to protect tanks and vessels from damage or deformation caused by changes in process pressure and vacuum conditions. Withstand the pressure of the stored product under normal operating conditions. Designs available for tank top mounting, side mounting and "in-line" applications.

TANK PROTECTION



VAREC 711 SERIES **SPRING LOADED PRESSURE** **RELIEF VENT**

Protects low and medium pressure storage tanks, gas headers, process vessels and waste gas collection systems from being overpressured.



ANDERSON GREENWOOD TYPE **96A WEIGHT LOADED VACUUM** **BREAKER**

The 96A is a weight-loaded vacuum breaker designed to compliment the pressure relief products, especially when seeing high positive operating pressures.



VAREC 7000 SERIES **MUSHROOM (FREE) VENT**

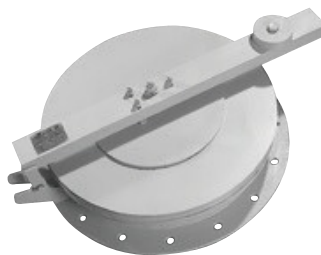
Free vent relieves to atmosphere and commonly used to protect atmospheric tanks containing non-volatile liquids. Designed to minimize back pressure and to bolt directly to a standard flange on the tank top. May also be mounted on a flame arrester.

TANK PROTECTION



VAREC 221 SERIES **EMERGENCY PRESSURE RELIEF** **MANWAY COVER**

Provides emergency venting of low pressure storage tanks and vessels when exposed to abnormal internal pressure or vacuum beyond capability of the breather vent. Also allows quick and easy access for tank inspection and maintenance.



VAREC 4210A SERIES **EMERGENCY PRESSURE VENT** **AND MANWAY COVER**

Designed to provide emergency venting of low pressure storage tanks and vessels. Protects the tank from rupture. Vacuum relief option provides additional vacuum protection.



VAREC 5400A SERIES **FLAME ARRESTER**

Group "D", end-of-line flame arrester is designed to prevent propagation of flame from external sources into a storage vessel.

FLAME ARRESTER

FLAME ARRESTER



VAREC 5000/5010 SERIES FLAME ARRESTER

Group "D" end-of-line flame arresters used in gas piping systems and petroleum storage tank roofs to prevent the propagation of a flame into the system. Extendable bank design for ease of maintenance.



VAREC 5810B/5820B RELIEF VALVE WITH FLAME ARRESTER

A combination of the 2010B/2020B Series Pressure and Vacuum Relief Valve and the 5000 Series Flame Arrester. This unit combines the high flow capacity of the Relief Valve with the easy-to-maintain extensible bank Flame Arrester for maximum protection and reliable operation.



VAREC 5910B/5920B SERIES RELIEF VALVE WITH FLAME ARRESTER

A combination of the 2010B/2020B Series Pressure and Vacuum Relief Valve and the 5400A Series Flame Arrester. This unit combines the high flow capacity of the Relief Valve with the easy-to-maintain Flame Arrester for maximum protection and reliable operation.

BLANKETING SYSTEMS



ANDERSON GREENWOOD TANK BLANKETING REGULATORS

Tank Blanketing provides an inert gas blanket over the liquid in a liquid storage tank. The Trans-Zero Regulator is a pilot operated, dome-loaded diaphragm type regulator capable of reducing blanketing gas in a single step providing bubble-tight shut-off and low maintenance costs.



VAREC 180 SERIES DOUBLE PORT PRESSURE REGULATOR

Provides upstream and downstream control for use on vapor recovery systems where sensitive control at low pressures is required. "Double port" design achieves a sensitivity of less than five percent.



VAREC 42 SERIES SAMPLING AND GAUGING HATCH COVER

Designed to provide quick access to tanks for product gauging, temperature measurement and sampling.

TANK ACCESSORIES

TANK ACCESSORIES



VAREC 4310 SERIES **SAMPLING AND GAUGING** **HATCH COVER**

Installed on tank roofs or roof flanges to provide quick access for product gauging, temperature measurement or sampling.

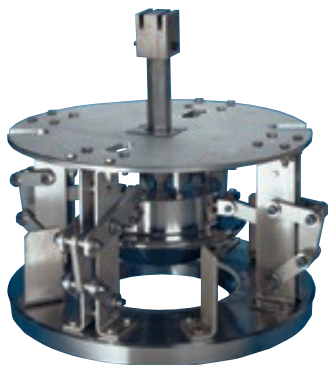
SPECIALTY VALVES



ANDERSON GREENWOOD TYPE RCRV **RESERVE CAPACITY RELIEF VALVE**

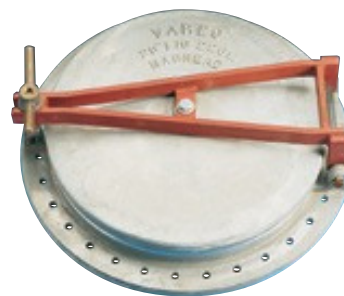
Designed to provide overpressure protection on low pressure, low temperature storage tanks when a large volume of vapor is generated by unusual conditions. O-ring seat provides bubble-tight performance to 95% of set pressure. Full open at set pressure – no overpressure required to achieve rated capacity.

SPECIALTY VALVES



ANDERSON GREENWOOD TYPE ITV **INTERNAL TANK VALVE**

Liquid storage - LNG, LPG, NH₃, LOX, etc. The Internal Tank Valve is a fail-safe isolation valve for bottom and side withdrawal tanks.



VAREC 220 SERIES **ROOF MANWAY COVER**

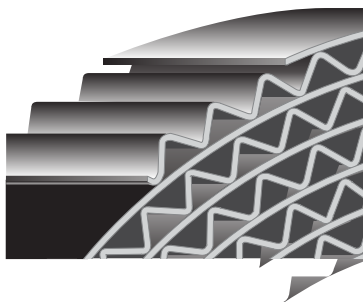
Designed for use on tanks where quick and easy personnel access is desired.

Flame and Detonation Arrestors

Features and Benefits

Larger Crimp Size

- Less pressure drop
- Less maintenance
- Easier cleaning



Fluoropolymer Coated Hardware

- Provides outstanding corrosion and chemical resistance

Removable Element

- Easily removable for cleaning and replacement



Hinged Element

- Facilitates easy access



Deflagration Flame Arrestors

Enardo™ 7 Series



- Concentric/Eccentric
- Bi-Directional Design
- Size 1 to 36 in. / 25 to 900 mm
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel
- Gas Groups D (IIA), C (IIB3), B (IIC)
- FM Approved-Group D (IIA) Gases 2 to 12 in. / 50 to 300 mm
- ISO-16852 Certified D (IIA), C (IIB3) 1 to 12 in. / 25 to 300 mm

High Pressure Deflagration Flame Arrestors

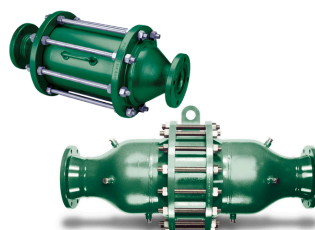
Enardo 8 Series



- Concentric/Eccentric
- Bi-Directional Design
- Size 2 to 24 in. / 50 to 600 mm
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- Gas Groups B, C, D

Detonation Flame Arrestors

Enardo DFA Series



- Concentric/Eccentric
- Bi-Directional Design
- Size 1 to 48 in. / 25 to 1200 mm
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- Gas Groups D (IIA), C (IIB3), B (IIC)
- U.S. Coast Guard Approved D, C 1 to 24 in. / 25 to 600 mm
- ATEX Approved-IIA, IIB3 1 to 24 in. / 25 to 600 mm

Threaded In-line Flame Arrestors

Enardo IL Series



- Bi-Directional Design
- Size 2 to 4 in. / 13 to 100 mm
- Gas Group D (IIA)
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel

Free Vent Flame Arrestors

Enardo FVFA Series



- Size 3/4 to 36 in. / 20 to 900 mm
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel
- Gas Groups D (IIA), C (IIB3), B (IIC)
- ISO-16852 Certified 2 to 12 in. / 50 to 300 mm D (IIA) and C (IIB3)

Vent Stack Flame Arrestors

Enardo 8800, Enardo 9900



- Size 1 to 6 in. / 25 to 150 mm
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel
- Gas Groups D (IIA)

Source:



Emerson Tank
Management Catalog

Pressure and Vacuum Relief Valves

Pressure-Vacuum Relief Valve Pipe Away Enardo™ 450



Pressure-Vacuum Relief Valve Vent-to- Atmosphere Enardo 550



Pressure-Vacuum Relief Valve Pipe Away Enardo 850, Enardo 850/MVC, Enardo 860



Pressure-Vacuum Relief Valve Vent- to-Atmosphere Enardo 950, Enardo 960



Pressure Relief Valve Enardo 851, Enardo 951, Enardo 861, Enardo 961



Pressure Relief Valve Enardo 851, Enardo 952, Enardo 952/MVC, Enardo 953, Enardo 861, Enardo 962, Enardo 963



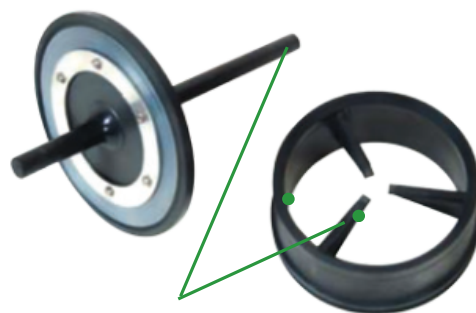
Features and Benefits

Economical

- Replaceable seat
- Stainless steel pallet with FEP Teflon® seal
- Excellent flow characteristics
- High performance coating for harsh environments

Superior Performance

- Enardo Saber® dual pallet guide system reseats the valve in the same spot each time retaining the valve's seal characteristics



Enardo Saber®
Guide System

- Anti-freeze and non-stick design
- Replaceable seat reduces maintenance cost and extends valve life



Replaceable Seat

- Advanced composite - Polyphenylene Sulfide (PPS) pallet and seat that provides superior corrosive resistance to chemical attack and non-stick surface

Vent Valves and Emergency Vents

Features and Benefits

Time Proven Performance

- Economical production storage tank applications



Emergency Relief

- Provides emergency venting relief per API 2000. Used in conjunction with pressure vacuum relief valves
- Provides superior relieving capacity for emergency conditions
- Increased level of tank safety in emergency conditions
- Highest relief settings available

Non Pressure Relief

- High capacity flow for non-flammable or non-volatile storage tanks
- Prevents foreign matter from entering tank

In-Line and Stack Vent Valves

Enardo™ 800-SO, Enardo 800-PSO, Enardo 900-SO



- Size: 2, 3, 4 in. / 50, 80, 100 mm
- Pressure: 1.0 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 4.3 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.4 oz./sq. in. / 1.7 mbar
- Aluminum

In-Line and Stack Vent Valves

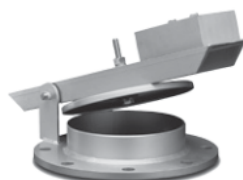
Enardo ES-800-SO, Enardo ES-800-PSO, Enardo ES-900-SO



- Size: 2, 3, 4 in. / 50, 80, 100 mm
- Pressure: 1.0 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 4.3 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.4 oz./sq. in. / 1.7 mbar
- Aluminum

Emergency Relief Vent

Enardo 2000



- Size: 4, 8, 10, 12, 16, 18, 20, 24 in. / 100, 200, 250, 300, 400, 450, 500, 600 mm
- Pressure: 2 to 32 oz./sq. in. in 0.5 oz./sq. in. / 8.6 mbar to 138.0 mbar in 2.2 mbar increments
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- Optional Remote Monitoring • EN 13463-1 and EN 13463-5 Certified

Emergency Relief Vent

Enardo 2100



- Size: 16, 20, 24 in. / 400, 500, 600 mm
- Pressure: 0.7 to 8.0 oz./sq. in. in 0.5 oz./sq. in. increments / 3.0 mbar to 34.0 mbar in 2.2 mbar increments
- Aluminum/Carbon steel, 304 Stainless steel, 316 Stainless steel

Emergency Relief Vent

Enardo 2500



- Size: 16, 20, 24 in. / 400, 500, 600 mm
- Pressure: 4 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 17.2 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.5, 0.75, 1.0, 2.0 oz./sq. in. / 2.2, 3.2, 4.3, 8.6 mbar
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- EN 13463-1 and EN 13463-5 Certified

Free Vent

Enardo 4000, Enardo 4100



- Size: 2, 3, 4, 6, 8, 10, 12 in. / 50, 80, 100, 150, 200, 250, 300 mm
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel

Rim Vent



- Size: 6 in. / 150 mm
- Pressure: 0.5, 1, 2, 4, 8 and 12 oz./sq. in. / 2.2, 4.3, 8.6, 17.2, 34.5, 51.7 mbar
- Aluminum

Vent Valves and Emergency Vents

Features and Benefits

Time Proven Performance

- Economical production storage tank applications



Emergency Relief

- Provides emergency venting relief per API 2000. Used in conjunction with pressure vacuum relief valves
- Provides superior relieving capacity for emergency conditions
- Increased level of tank safety in emergency conditions
- Highest relief settings available

Non Pressure Relief

- High capacity flow for non-flammable or non-volatile storage tanks
- Prevents foreign matter from entering tank

In-Line and Stack Vent Valves

Enardo™ 800-SO, Enardo 800-PSO, Enardo 900-SO



- Size: 2, 3, 4 in. / 50, 80, 100 mm
- Pressure: 1.0 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 4.3 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.4 oz./sq. in. / 1.7 mbar
- Aluminum

In-Line and Stack Vent Valves

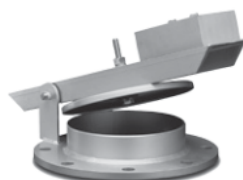
Enardo ES-800-SO, Enardo ES-800-PSO, Enardo ES-900-SO



- Size: 2, 3, 4 in. / 50, 80, 100 mm
- Pressure: 1.0 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 4.3 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.4 oz./sq. in. / 1.7 mbar
- Aluminum

Emergency Relief Vent

Enardo 2000



- Size: 4, 8, 10, 12, 16, 18, 20, 24 in. / 100, 200, 250, 300, 400, 450, 500, 600 mm
- Pressure: 2 to 32 oz./sq. in. in 0.5 oz./sq. in. / 8.6 mbar to 138.0 mbar in 2.2 mbar increments
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- Optional Remote Monitoring • EN 13463-1 and EN 13463-5 Certified

Emergency Relief Vent

Enardo 2100



- Size: 16, 20, 24 in. / 400, 500, 600 mm
- Pressure: 0.7 to 8.0 oz./sq. in. in 0.5 oz./sq. in. increments / 3.0 mbar to 34.0 mbar in 2.2 mbar increments
- Aluminum/Carbon steel, 304 Stainless steel, 316 Stainless steel

Emergency Relief Vent

Enardo 2500



- Size: 16, 20, 24 in. / 400, 500, 600 mm
- Pressure: 4 to 16 oz./sq. in. in 0.5 oz./sq. in. increments / 17.2 mbar to 69.0 mbar in 2.2 mbar increments
- Vacuum: 0.5, 0.75, 1.0, 2.0 oz./sq. in. / 2.2, 3.2, 4.3, 8.6 mbar
- Carbon steel, 304 Stainless steel, 316 Stainless steel
- EN 13463-1 and EN 13463-5 Certified

Free Vent

Enardo 4000, Enardo 4100



- Size: 2, 3, 4, 6, 8, 10, 12 in. / 50, 80, 100, 150, 200, 250, 300 mm
- Aluminum, Carbon steel, 304 Stainless steel, 316 Stainless steel

Rim Vent



- Size: 6 in. / 150 mm
- Pressure: 0.5, 1, 2, 4, 8 and 12 oz./sq. in. / 2.2, 4.3, 8.6, 17.2, 34.5, 51.7 mbar
- Aluminum

Tank Blanketing and Vapor Recovery Regulators

Features and Benefits

Ideal for Blanketing Small Tanks and Vessels

- Compact size
- Easy to install and maintain

Balanced Blanketing Regulator

- Fully balanced design
- Reduces inlet pressure sensitivity
- Accurately controls tank pressure at low pressure settings on tank blanketing systems

Accurate Pressure Control for Very Low-Pressure Blanketing Systems

- Provides quick response with downstream pressure sensed directly by the diaphragm
- Precise control even at low-pressure settings
- Pitot tube creates a dynamic boost that helps provide greater capacity

The Accuracy of a Pilot-Operated Regulator in a Direct-Operated Design

- Balanced trim design and large diaphragm area provide high accuracy
- Minimal hysteresis
- Low inlet pressure sensitivity

Tank Blanketing Regulator

Fisher™ Type T205 Series



- Body Size: NPS 3/4 and 1 / DN 20 and 25
- Control Pressure Range: 1 in. w.c. to 7 psig / 2.5 mbar to 0.48 bar
- Maximum Inlet Pressure: 200 psig / 13.8 bar
- Flow up to: 24,765 SCFH / 663 Nm³/h of Nitrogen
- Operation Method: Direct-Operated
- Body Material: Cast iron, steel and stainless steel
- Bulletin No.: 74.1:T205
- Compact size is ideal for blanketing small tanks and vessels

Tank Blanketing Regulator

Fisher Type T205B



- Body Size: NPS 3/4 and 1 / DN 20 and 25
- Control Pressure Range: 1 in. w.c. to 7 psig / 2.5 mbar to 0.48 bar
- Maximum Inlet Pressure: 200 psig / 13.8 bar
- Flow up to: 19,388 SCFH / 519 Nm³/h of Nitrogen
- Operation Method: Direct-Operated
- Body Material: Cast iron, steel and stainless steel
- Bulletin No.: 74.1:T205B

Tank Blanketing Regulator

Fisher Type Y692



- Body Size: NPS 1-1/2 and 2 / DN 40 and 50
- Control Pressure Range: 1 in. w.c. to 10 psig / 2 mbar to 0.69 bar
- Maximum Inlet Pressure: 150 psig / 10.3 bar
- Flow up to: 19,820 SCFH / 531 Nm³/h of Nitrogen
- Operation Method: Direct-Operated
- Body Material: Cast iron, WCC steel and stainless steel
- Bulletin No.: 74.1:Y692

Tank Blanketing Regulator

Fisher Type Y693



- Body Size: NPS 1-1/2 and 2 / DN 40 and 50
- Control Pressure Range: 0.5 in. w.c. to 10 psig / 1 mbar to 0.69 bar
- Maximum Inlet Pressure: 150 psig / 10.3 bar
- Flow up to: 26,700 SCFH / 716 Nm³/h of Nitrogen
- Operation Method: Direct-Operated
- Body Material: Cast iron, steel and stainless steel
- Bulletin No.: 74.1:Y693

Tank Blanketing and Vapor Recovery Regulators

Tank Blanketing Regulator

Fisher™ ACE95 Series



- Body Size: NPS 3/4, 1, 1 x 2 and 2 / DN 20, 25, 25 x 50 and 50
- Control Pressure Range: -5 in. w.c. to 1.5 psig / -12 mbar to 0.10 bar
- Maximum Inlet Pressure: 200 psig / 13.8 bar
- Body Orientation: In-line or Angle
- Flow up to: 499,600 SCFH / 13,390 Nm³/h of Nitrogen
- Operation Method: Pilot-Operated
- Body Material: Stainless steel
- Bulletin No.: 74.1:ACE95

Tank Blanketing Regulator

Fisher Type 1190



- Body Size: NPS 1, 2, 3, 4, 6, 8 x 6 and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150 and 300 x 150
- Control Pressure Range: 0.25 in. w.c. to 7 psig / 0.6 mbar to 0.48 bar
- Maximum Inlet Pressure: 400 psig / 27.6 bar
- Flow up to: 2,811,000 SCFH / 75,335 Nm³/h of Nitrogen
- Operation Method: Pilot-Operated
- Body Material: Cast iron, steel and stainless steel
- Bulletin No.: 74.1:1190

Vapor Recovery Valve

Fisher T208 Series



- Body Size: NPS 3/4 and 1 / DN 20 and 25
- Control Pressure Range: 2 in. w.c. to 7 psig / 5 mbar to 0.48 bar
- Maximum Inlet Pressure: 75 psig / 5.2 bar
- Flow up to: 2320 SCFH / 62.2 Nm³/h of Nitrogen
- Operation Method: Direct-Operated
- Body Material: Cast iron, steel and stainless steel
- Bulletin No.: 74.2:T208

Vapor Recovery Valve

Fisher Type 1290



- Body Size: NPS 1, 2, 3, 4, 6, 8 x 6 and 12 x 6 / DN 25, 50, 80, 100, 150, 200 x 150 and 300 x 150
- Control Pressure Range: 0.5 in. w.c. to 7 psig / 1 mbar to 0.48 bar
- Maximum Inlet Pressure: 12.5 psig / 0.86 bar
- Flow up to: 327,400 SCFH / 8774 Nm³/h of Nitrogen
- Operation Method: Pilot-Operated
- Body Material: Steel and stainless steel
- Bulletin No.: 74.2:1290

Features and Benefits

Accurate Pressure Control on Low-Pressure Systems

- Oversized actuator offers high sensitivity to changes in tank pressure
- High accuracy to pressure control
- Single pilot design minimizes issues with overlapping setpoints

Very Accurate Pressure Control on Low-Pressure Systems

- High-capacity
- Very accurate
- Top-entry design reduces maintenance time and manpower requirements
- Not affected by changes in the pressure recovery system

Ideal for Small Vapor Recovery Systems

- Designed for use as a backpressure or relief valve

High-Capacity and Highly Accurate

- High-capacity
- Very accurate
- Opens when tank pressure increases above desired setpoint
- Not affected by changes in the pressure recovery system