



VALVES & CONTROLS



ANDERSON GREENWOOD CROSBY VAREC PRESSURE RELIEF VALVES OVERVIEW

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ANDERSON GREENWOOD • CROSBY • VAREC

PRESSURE RELIEF VALVES OVERVIEW

Contents

Direct Spring Pressure Relief Valves	3 - 5
Safety Valves	6
High Pilot Operated Pressure Relief Valves	7 - 9
Low Pilot Operated Pressure Relief Valves	10
Tank Protection	11 - 13
Flame Arrestment	14 - 15
Blanketing Systems	15
Tank Accessories	16
Specialty Valves	17 - 18
Certifications	18
Nuclear Products	19
Sizing Software and Service	20
Selection Matrix	21 - 22



Global Performance

Pentair Flow Control is an industry leader in pressure relief valve technology. A single point provider, we offer an extensive product line for reliable performance with lower valve life-cycle costs. Our unmatched engineering and technical expertise provides you with the pressure management products, application solutions and services that will positively impact your business.

Test Facilities

Our Texas and Massachusetts combined testing and development facilities have been the catalyst in continuing our 135 years of product development and industry leadership. The engineering teams of Anderson Greenwood, Crosby and Varec have designed testing equipment and procedures that assure optimum valve performance under all service conditions. These facilities are used for experimentation, testing and emissions on relief devices. Our Texas facility also features cryogenic testing capabilities down to -320°F [-196°C]. A recent upgrade to our Texas facility included a 11,000 gallon liquid nitrogen storage tank, high pressure gas vessels, full liquid testing capabilities and a large test laboratory. It has also been approved by ASME as a test facility to conduct certified flow testing.

The world's most comprehensive product line. With the largest and most sophisticated facilities for steam, air, gas and liquid.

Pressure Relief Valves

Direct Spring Operated PRVs

- Brand/Model:** **Anderson Greenwood Series 60 (Types 61 and 63B)**
- Features:** Designed for low and medium set pressure gas, vapor and liquid or gas thermal relief applications. Brass construction.
- Sizes:** 1/2" x 1" to 3/4" x 1"
- Orifices:** 0.077 to 0.150 in² [0.497 to 0.968 cm²]
- Connections:** NPT
- Temperature Range:** -320 to 400°F [-196 to +205°C]
- Set Pressures:** 30 to 531 psig [2.07 to 36.6 barg]
- Code:** ASME VIII
- Request data sheet: ANGMC-0244*



Direct Spring Operated PRVs

- Brand/Model:** **Anderson Greenwood Series 80 (Types 81, 83 and 86)**
- Features:** Soft seat design for premium seat tightness provides repeatable leak-tight performance before and after each relief cycle. Full lift design with external adjustable blowdown and replaceable soft seats and seals. Allows higher operating pressure. Gas, vapor and steam service.
- Sizes:** 1/2" x 3/4" to 2" x 3"
- Orifices:** 0.049 to 1.287 in² [0.316 to 8.303 cm²]
- Connections:** NPT, Flanged
- Temperature Range:** -423 to +550°F [-253 to +288°C]
- Set Pressures:** 20 to 10,000 psig [1.40 to 689.5 barg]
- Code:** ASME VIII
- Request data sheet: ANGMC-0244*



Direct Spring Operated PRVs

- Brand/Model:** **Anderson Greenwood Series 80 (Type 81P)**
- Features:** Soft seat design for liquid service to ensure stability with no chatter. The trim is fully back pressure balanced without the use of a bellows. Replaceable soft seats and seals.
- Sizes:** 1/2" x 3/4" to 2" x 3"
- Orifices:** 0.049 to 1.287 in² [0.316 to 8.303 cm²]
- Connections:** NPT, Flanged
- Temperature Range:** -65 to +400°F [-54 to +205°C]
- Set Pressures:** 50 to 6000 psig [3.45 to 413.7 barg]
- Code:** ASME VIII
- Request data sheet: ANGMC-0244*



Pressure Relief Valves

Direct Spring Operated PRVs



Brand/Model: Crosby Styles JOS-E and JBS-E

Features: Conventional and Balanced Bellows Spring loaded pressure relief valves built in accordance with API Standards 526 and 527 for air, gas, steam and vapor. Styles JLT-JOS-E and JLT-JBS-E for liquid service and two phase applications.

Sizes: 1" x 2" to 8" x 10"

Orifices: 0.110 to 27.872 in² [0.710 to 167.7 cm²]

Inlet Ratings: ANSI Class 150 to 2500

Temperature Range: -450 to +1000°F [-268 to +538°C]

Set Pressures: 5 to 6000 psig [0.34 to 413 barg]

Code: ASME VIII [15 psig and above]

Request data sheet: CROMC-0297

Direct Spring Operated PRVs



Brand/Model: Crosby Style JB-TD ("Over T")

Features: Large orifice pressure relief valve product line is an extension of API Standard 526 designs for air, gas, steam and vapor applications. The broad JB-TD product offering represents an alternative to multiple, smaller orifice relief valves.

Sizes: 10" x 14" to 20" x 24"

Orifices: 42.19 to 185.0 in² [272.19 to 1193.55 cm²]

Inlet Rating: ANSI Class 300

Temperature Range: -20 to +450°F [-29 to +232°C]

Set Pressure: 25 to 300 psig [1.72 to 20.69 barg]

Code: ASME VIII

Request data sheet: CROMC-0290

Direct Spring Operated PRVs



Brand/Model: Crosby Series 900 OMNI-TRIM®

Features: Single trim design, fixed blowdown design for medium flow of air, gas, steam, vapor, liquid and two phase applications. Full nozzle design. Available with metal or O-ring seat construction.

Sizes: 1/2" x 1" to 2" x 2"

Orifices: 0.074 to 0.503 in² [0.477 to 3.25 cm²]

Connections: NPT, Flanged, Socket Weld

Temperature Range: -450 to +750°F [-268 to +399°C]

Set Pressures: 5 to 5000 psig [0.34 to 344.83 barg]

Code: ASME VIII [15 psig and above]

Request data sheet: CROMC-0294

Pressure Relief Valves

Direct Spring Operated PRVs

Brand/Model:	Crosby Series 800
Features:	Adjustable blowdown design for medium flow of air, gas, vapor and steam applications. External precise blowdown adjustment provides shorter blowdown than the Series 900. Full nozzle design. Available with metal or O-ring seat.
Sizes:	3/4" x 1" to 2" x 2"
Orifices:	0.110 to 0.503 in ² [0.71 to 3.25 cm ²]
Connections:	NPT, Flanged, Socket Weld
Temperature Range:	-450 to +750°F [-268 to +399°C]
Set Pressures:	15 to 1500 psig [1.03 to 103.42 barg]
Code:	ASME VIII
	<i>Request data sheet: CROMC-0294</i>



Direct Spring Operated PRVs

Brand/Model:	Crosby Series BP OMNI-TRIM®
Features:	Balanced piston, single trim design for gas, vapor and liquid applications involving variable back pressure. Full nozzle design with O-ring seat as standard.
Sizes:	3/4" x 1" and 1" x 1"
Orifices:	0.074 and 0.110 in ² [0.477 and 0.71 cm ²]
Connections:	NPT, Flanged
Temperature Range:	-20 to +400°F [-28 to +204°C]
Set Pressures:	50 to 1500 psig [3.45 to 103.44 barg]
Code:	ASME VIII
	<i>Request data sheet: CROMC-0293</i>



Direct Spring Operated PRVs

Brand/Model:	Crosby Series 82
Features:	Designed to provide premium performance in the natural gas market. The Series 82 has a rugged construction designed specifically for high pressure multi stage natural gas compressors. The Series 82 valve is designed to provide superior seating performance using a Viton® o-ring seat. The 2-piece body design with replaceable seat and seals reduce downtime and maintenance costs over the life of the valve.
Sizes:	3/4" x 1" to 1" x 1"
Orifices:	D 0.127 in ² [0.819 cm ²] E 0.221 in ² [1.423 cm ²]
Connections:	MNPT x FNPT
Temperature Range:	-15°F to 400°F [-26°C to 204°C]
Set Pressures:	15 to 1500 psig [1.03 to 103 barg]
Code:	ASME VIII
	<i>Request data sheet: CROMC-0806</i>



Safety Valves

Direct Spring Operated



Brand/Model:	Crosby Style HE ISOFLEX®
Features:	High capacity safety valve for drum service, saturated steam applications. Two ring control and back pressure-assist close design are standard. ISOFLEX® seat design provides seat tightness up to 96% of set pressure.
Sizes:	2 1/2" x 6" to 4" x 8"
Orifices:	1.840 to 7.070 in ² [11.87 to 45.61 cm ²]
Connections:	ANSI Flanged or Butt Weld Inlet and ANSI Flanged Outlet
Maximum Temperature:	Saturated steam
Maximum Set Pressure:	3000 psig [207 barg]
Code:	ASME I

Request data sheet: CROMC-0295

Direct Spring Operated



Brand/Model:	Crosby Style HSJ
Features:	Full nozzle safety valve for saturated and superheated steam service. Two ring control. Style HSJ-DOW with closed bonnet and screwed cap for Dowtherm service.
Sizes:	1 1/2" x 2" to 6" x 8"
Orifices:	0.307 to 11.045 in ² [1.98 to 71.25 cm ²]
Inlet Ratings:	ANSI Class 150 to 2500
Maximum Temperature:	1000°F [538°C]
Maximum Set Pressure:	2700 psig [186.2 barg]
Code:	ASME I and VIII

Request data sheet: CROMC-0295

Direct Spring Operated



Brand/Model:	Crosby Style HCI ISOFLEX®
Features:	High capacity safety valve for saturated and superheated steam service. Two ring control and optional restricted lift feature. ISOFLEX® seat design provides seat tightness up to 96% of set pressure.
Sizes:	1 1/2" x 3" to 6" x 10"
Orifices:	0.994 to 19.29 in ² [6.41 to 124.45 cm ²]
Connections:	ANSI Flanged or Butt Weld Inlet and ANSI Flanged Outlet
Maximum Temperature:	1100°F [593°C]
Maximum Set Pressure:	3000 psig [207 barg]
Code:	ASME I and VIII

Request data sheet: CROMC-0295

Pilot Operated Relief Valves

High Pressure

Brand/Model:

Anderson Greenwood Series 200

Features:

Non-flowing, pop action pilot operated design principally intended for gas, vapor and many mixed phase applications. Suitable for severe service where dirt, hydrates and high moisture levels occur in the fluid media.

Sizes:

1" x 2" to 10" x 14"

Orifices:

0.110 to 63.50 in² [0.710 to 409.7 cm²]

Inlet Ratings:

ANSI Class 150 to 2500

Temperature Range:

-423 to +600°F [-253 to +315°C]

Set Pressures:

25 to over 6170 psig [1.72 to over 425.52 barg]

Code:

ASME VIII

Request data sheet: ANGMC-0243



High Pressure

Brand/Model:

Anderson Greenwood Series 400

Features:

Non-flowing, modulating action pilot operated design suitable for gas, liquid and many mixed phase applications, including dirty and/or wet applications. Modulating action eliminates destructive effects of "liquid hammer." Lifts proportionally according to demand.

Sizes:

1" x 2" to 10" x 14"

Orifices:

0.110 to 63.50 in² [0.710 to 409.7 cm²]

Inlet Ratings:

ANSI Class 150 to 600

Temperature Range:

-65 to +600°F [-54 to +315°C]

Set Pressures:

15 to 1480 psig [1.03 to 102.0 barg]

Code:

ASME VIII

Request data sheet: ANGMC-0243



High Pressure

Brand/Model:

Anderson Greenwood Series 400 Iso-Dome

Features:

Iso-Dome accessory for the Series 400 pilot provides protection of critical pilot internals from highly viscous process media.

Sizes:

1" x 2" to 10" x 14"

Orifices:

0.110 to 63.50 in² [0.710 to 409.7 cm²]

Inlet Ratings:

ANSI Class 150 to 900

Temperature Range:

-65 to +500°F [-54 to +260°C]

Set Pressures:

15 to 1480 psig [1.03 to 102.0 barg]

Code:

ASME VIII

Request data sheet: ANGMC-0243



Pilot Operated Relief Valve

High Pressure



Brand/Model:

Anderson Greenwood Series 500

Features:

Unique, modulating action pilot operated relief valve with soft seats having the ability to handle hot water, steam, hot hydrocarbon vapors or liquids, using inert plastic soft goods.

Sizes:

1 1/2" x 2" to 10" x 14"

Orifices:

0.110 to 63.50 in² [0.710 to 409.7 cm²]

Inlet Ratings:

ANSI Class 150 to 600

Temperature Range:

-65 to +515°F [-54 to +268°C]

Set Pressures:

15 to 720 psig [1.03 to 49.6 barg]

Code:

ASME VIII

Request data sheet: ANGMC-0243

High Pressure



Brand/Model:

Anderson Greenwood Type 727

Features:

Pop action pilot safety valve with metal seated pilot valve and main valve extends the use of pilot technology to 1000°F [538°C]. Suitable for steam or gas service.

Sizes:

2" x 3" to 8" x 10"

Orifices:

0.503 to 26.0 in² [3.245 to 167.7 cm²]

Inlet Ratings:

ANSI Class 150 to 600

Temperature Range:

Up to 1000°F [538°C]

Code:

ASME VIII

Request data sheet: ANGMC-0243

High Pressure



Brand/Model:

Anderson Greenwood Series 800

Features:

High set pressure capability, non-flowing, modulating pilot operated pressure relief valve design for pressures up to 6170 psig [425.52 barg]. Suitable for gas, liquid or mixed phase lading fluids, including dirty and/or wet services.

Sizes:

1" x 2" to 4" x 6"

Orifices:

0.110 to 9.489 in² [0.710 to 61.21 cm²]

Inlet Ratings:

ANSI Class 900 to 2500

Temperature Range:

-65 to +600°F [-54 to +315°C]

Set Pressures:

1481 to 6170 psig [102.13 to 425.52 barg]

Code:

ASME VIII

Request data sheet: ANGMC-0243

Pilot Operated Relief Valves

High Pressure

Brand/Model:

Anderson Greenwood Series 5100

Features:

Revolutionary modulating action pilot operated relief valve designed specifically for Economizer service meeting the stringent requirements of ASME Code Section I. Certified capacities for steam and water. Proportional design opens according to relief demand, thereby eliminating chatter. Suitable for steam, water or flashing water service.

Sizes:

1 1/2" x 2" to 8" x 10"

Orifices:

0.785 to 38.96 in² [5.065 to 251.3 cm²]

Inlet Ratings:

ANSI Class 150 to 2500

Max Temperature:

515°F [268°C]

Set Pressures:

15 to 6170 psig [1.03 to 454.4 barg]

Code:

ASME I

Request data sheet: ANGMC-0276



High Pressure

Brand/Model:

Anderson Greenwood Series 5200

Features:

Developed specifically to serve economizer applications requiring pressure relief under the stringent requirements of ASME Section. This unique and challenging application requires premium performance on a valve that must have ASME Section I certified capacities for both steam and water. A modulating pilot operated pressure relief valve is the ideal solution to this difficult application.

Sizes:

1 1/2" x 2" to 4" x 6"

Orifices:

F 0.307 in² [1.98 cm²] thru P 6.38 in² [41.16 cm²]

Inlet Ratings:

ANSI Class 150 to 2500

Temperature Range:

Up to 1000°F [+538°C]

Set Pressures:

15 to 6250 psig [1.03 to 431 barg]

Code:

ASME I and VIII

Request data sheet: ANGMC-0803



High Pressure

Brand/Model:

Anderson Greenwood Series LCP

Features:

Full bore, non-flowing pilot design for gas and vapor service. Integral field test connection and back flow preventer are standard accessories in a compact assembly.

Sizes:

1" x 2" to 3" x 4"

Orifices:

0.785 to 7.069 in² [5.065 to 45.6 cm²]

Inlet Ratings:

ANSI Class 150 to 900

Temperature Range:

-20 to +400°F [-29 to +205°C]

Set Pressure Range:

25 to 2200 psig [1.72 to 151.72 barg]

Request data sheet: ANGMC-0254



Pilot Operated Relief Valves

Low Pressure



Brand/Model:

Anderson Greenwood Type 9300

Features:

The Type 9300 design is a full body valve to pipe away the discharge if necessary and is balanced against back pressure. This design can be used in the pilot operated pressure relief mode and also provide pilot operated vacuum relief.

Sizes:

2" x 3" to 12" x 16"

Orifices:

3.35 to 113.0 in² [21.61 to 729.03 cm²]

Temperature Range:

-320 to +200°F [-196 to +93°C]

Pressure Range:

4" wc to 50 psig [10 mbarg to 3.45 barg]

Vacuum Range:

-1 oz [-4.3 mbarg] full open weight loaded

Vacuum Range:

-2 in wc to -5 psig pilot operated [-5 mbarg to -0.345 barg]

Code:

ASME VIII [15 psig and above]

Request data sheet: ANGMC-0251

Low Pressure



Brand/Model:

Anderson Greenwood Type 9200 Vent

Features:

The Type 9200 design can be used in the pilot operated pressure relief mode and also provide weight loaded or pilot operated vacuum relief. The 9200 vents directly to atmosphere and has no provision to pipe away the discharge.

Sizes:

2" x 3" to 12" x 16"

Orifices:

3.35 to 113.0 in² [21.61 to 729.03 cm²]

Temperature Range:

-320 to +200°F [-196 to +93°C]

Pressure Range:

4" wc to 5 psig [-5.0 mbarg to 0.345 barg]

Vacuum Range:

-1 oz [-4.3 mbarg] full open weight loaded

Vacuum Range:

-2 in wc to -5 psig pilot operated [-5.0 mbarg to -0.345 barg]

Request data sheet: ANGMC-0251

Low Pressure



Brand/Model:

Anderson Greenwood Type 93

Features:

Introduced in 1968, this pilot operated pressure relief valve is designed with elastomer seats and seals for gas piping and chemical tank applications.

Sizes:

2" x 3" to 12" x 16"

Orifices:

2.29 to 84.0 in² [14.77 to 541.93 cm²]

Temperature Range:

-260 to +300°F [-162 to +149°C]

Set Pressures:

3" wc to 50 psig [7.5 mbarg to 3.45 barg]

Code:

ASME VIII [15 psig and above]

Request data sheet: ANGMC-0251

Low Pressure



Brand/Model:

Anderson Greenwood Series MLCP

Features:

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.

Sizes:

2" x 3" to 6" x 8"

Orifices:

3.14 to 28.27 in² [20.26 to 182.41 cm²]

Inlet Ratings:

ANSI Class 150

Temperature Range:

-20 to +400°F [-29 to +204°C]

Set Pressure Range:

3 to 14.99 psig [0.207 to 1.03 barg]

Request data sheet: ANGMC-0257

Tank Protection

Weight Loaded Pressure and Vacuum Relief Valve

Brand/Model: **Varec 2010B/2020B Series**

Features: 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.

Sizes: **2010B/2011B** 2" to 12"
2020B/2021B 2" x 3" to 12" x 14"

Connections: ANSI Class 125 Flat Face Drilling (Aluminum), ANSI Class 150 Raised or Flat Face Drilling (Carbon Steel and Stainless Steel)

Temperature Range: -65 to +350°F [-54 to +177°C] Pressure/Vacuum

Setting Range: 0.3 oz/in² to 2 psig [1.29 mbarg to 0.14 barg]

Request data sheet: VRCMC-0318



2010B

Weight Loaded Vacuum Relief Valve

Brand/Model: **Varec 3500B/3600B/3650B Series**

Features: 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.

Sizes: **3500B/3600B** 2" to 12"
3650B 2" x 3" to 12" x 14"

Connections: ANSI Class 125 Flat Face Drilling (Aluminum), ANSI Class 150 Raised or Flat Face Drilling (Carbon Steel and Stainless Steel)

Temperature Range: -65 to +350°F [-54 to +177°C]

Vacuum Setting Range: 0.3 oz/in² to 2 psig [1.29 mbarg to 0.14 barg]

Request data sheet: VRCMC-0300



3500B



3600B

Weight Loaded Pressure Relief Vent

Brand/Model: **Varec 7100B Series**

Features: 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.

Sizes: 2" to 12"

Connections: ANSI Class 125 Flat Face Drilling (Aluminum), ANSI Class 150 Raised or Flat Face Drilling (Carbon Steel and Stainless Steel)

Temperature Range: -65 to +350°F [-54 to +177°C]

Pressure Setting Range: 0.3 oz/in² to 2 psig [1.29 mbarg to 0.14 barg]

Request data sheet: VRCMC-0301



Tank Protection

Spring Loaded Pressure and Vacuum Relief Valve



2440

- Brand/Model:** **Varec 2440/2450 Series**
- Features:** 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.
- Sizes:** **2440** 2" to 12"
2450 2" x 2" to 12" x 12"
- Connections:** ANSI Class 125 Flat Face Drilling (Aluminum)
ANSI Class 150 Raised Face Drilling (Carbon Steel and Stainless Steel)
- Pressure Setting Range:** 1 to 50 psig [0.07 to 3.5 barg]
- Vacuum Setting Range:** 0.7 to 14 oz/in² [3.0 to 60 mbarg]
- Request data sheet: VRCMC-0314*

Spring Loaded Vacuum Relief Valve



4110A

- Brand/Model:** **Varec 4110A/3610/3660 Series**
- Features:** 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.
- Sizes:** **4110A/3610** 2" to 12"
3660 2" x 2" to 12" x 12"
- Connections:** ANSI Class 125 Flat Face Drilling (Aluminum),
ANSI Class 150 Raised Face Drilling (Carbon Steel and Stainless Steel)
- Relief Settings:** Up to 50 psig [3.5 barg]
- Request data sheet: VRCMC-0316*

Spring Loaded Pressure Relief Vent



- Brand/Model:** **Varec 711 Series**
- Features:** Protects low and medium pressure storage tanks, gas headers, process vessels and waste gas collection systems from being overpressured.
- Sizes:** 2" to 12"
- Connections:** ANSI Class 125 Flat Face Drilling (Aluminum)
ANSI Class 150 Raised Face Drilling (Carbon Steel and Stainless Steel)
- Temperature Range:** -65 to +350°F [-54 to +177°C]
- Pressure Setting Range:** 0.5 to 50 psig [0.035 to 3.5 barg]
- Request data sheet: VRCMC-0302*

Tank Protection

Weight-loaded Vacuum Breaker

- Brand/Model:** **Anderson Greenwood Type 96A**
- Features:** The 96A is a weight-loaded vacuum breaker designed to compliment the pressure relief products, especially when seeing high positive operating pressures.
- Sizes:** 4", 6", 8", 12"
- Vacuum Setting:** 1/2 oz/in² [2.2 mbarg] (standard)
1 1/2 oz/in² [6.6 mbarg] (optional)
- Maximum Allowable Positive Pressure:** Up to 85 psig [5.86 barg]
Request data sheet: ANGMC-0251



Mushroom (Free) Vent

- Brand/Model:** **Varec 7000 Series**
- Features:** 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.
- Sizes:** 2" to 12"
- Maximum Differential Pressure:** 1 psi [0.07 barg]
- Connections:** Bolts to standard ANSI Class 125 Flat Face flange
Request data sheet: VRCMC-0307



Emergency Pressure Relief Manway Cover

- Brand/Model:** **Varec 221 Series**
- Features:** 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.
- Sizes:** 18", 20", 24"
- Connections:** Drilled to API 650 dimensions, Flat Face flange standard. Drilled to ANSI Class 150 dimensions, Flat Face flange optional.
- Pressure Setting Range:** 0.5 to 6 oz/in² [2.15 to 25.86 mbarg]
- Vacuum Setting Range:** 0.5 to 1 oz/in² [2.15 to 4.31 mbarg]
Request data sheet: VRCMC-0310



Emergency Pressure Vent and Manway Cover

- Brand/Model:** **Varec 4210A Series**
- Features:** Designed to provide emergency venting of low pressure storage tanks and vessels. Protects the tank from rupture. Vacuum relief option provides additional vacuum protection.
- Sizes:** 18", 20", 24"
- Connections:** Drilled to ANSI Class 150 dimensions, Flat Face flange. Drilled to API 650 dimensions, Flat Face flange.
- Pressure Setting Range:** 2" wc to 2 psig [5 mbarg to 0.14 barg]
- Vacuum Setting Range:** -1.4" to -20" wc [-3.5 to -49 mm wc]
Request data sheet: VRCMC-0308



Flame Arrestment

Flame Arrester



- Brand/Model:** **Varec 5400A Series**
- Features:** Group "D", end-of-line flame arrester is designed to prevent propagation of flame from external sources into a storage vessel.
- Sizes:** 2" to 12" (Vertical Installation)
- Connections:** ANSI Class 125 Flat Face flange Drilling (Aluminum), ANSI Class 150 Raised Face flange Drilling (Carbon Steel and Stainless Steel)
- Pressure Rating:** Leak proof to 10 psig [0.69 barg]
- Maximum Pressure Differential:** 1 psi [0.07 barg]
- Approvals:** FM (Factory Mutual): all sizes, all materials. UL (Underwriters Laboratories) listed in all Aluminum construction in 2", 3", 4". Refer to product data sheet for additional information.

Request data sheet: VRCMC-0309

Flame Arrester



- Brand/Model:** **Varec 5000/5010 Series**
- Features:** 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.
- Sizes:** 2" to 12"
- Connections:** ANSI Class 125 Flat Face flange Drilling (Aluminum) ANSI Class 150 Raised Face flange Drilling (Carbon Steel and Stainless Steel)
- Pressure Rating:** Leak proof to 10 psig [0.69 barg]
- Maximum Pressure Differential:** 1 psi [0.07 barg]
- Approvals:** **5000 Series** UL (Underwriters Laboratories) listed in all Aluminum construction in 2", 3", 4", 6" and 10" sizes. (Vertical Installation)
5010 Series UL listed in all Aluminum construction as above in 2", 3" and 4" sizes. (Horizontal Installation) Refer to product request data sheet: for additional information.

Request data sheet: VRCMC-0315

Relief Valve with Flame Arrester



- Brand/Model:** **Varec 5810B/5820B Series**
- Features:** 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.

Request data sheet: VRCMC-0192

Flame Arrestment

Relief Valve with Flame Arrester

Brand/Model: **Varec 5910B/5920B Series**

Features: 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.

Request data sheet: VRCMC-0161



Blanketing Systems

Regulators

Brand/Model: **Anderson Greenwood Tank Blanketing Regulators**

Features: 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.

Connections: 1/2", 1", 2" threaded (NPT) and flanged ANSI 150, 300, 600

Temperature Range: -20 to +300°F [-29 to +149°C]

Maximum Inlet Pressure: 200 psig [14 barg]

Blanket Pressure Range: 0.5" wc to 6 psig [12.7 mm wc to 0.4 barg]

Request data sheet: ANGMC-0253



Double Port Pressure Regulator

Brand/Model: **Varec 180 Series**

Features: 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.

Sizes: 1" to 8"

Connections: 1": NPT threaded
2" to 8": Drilled to ASA 125 Flat Face (Aluminum),
Drilled to ANSI Class 150 Raised Face (Carbon Steel)

Pressure Sensing Line: **180/181** 2" NPT

186/187 1" NPT

Pressure Setting Range: -0.4 to 20" wc [1 to 50 mbarg]

Request data sheet: VRCMC-0303



Tank Accessories

Sampling and Gauging Hatch Cover



Brand/Model:

Varec 42 Series

Features:

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

Sizes:

4", 6", 8", 10"

Connections:

ANSI Class 125 Flat Face flange Drilling (Aluminum), Welded Connection (Available on standard carbon steel base only)

Working Pressure:

Up to 3 psig [0.207 barg]

Request data sheet: VRCMC-0313

Sampling and Gauging Hatch Cover



Brand/Model:

Varec 4310 Series

Features:

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

Sizes:

4", 8"

Connections:

ANSI Class 125 Flat Face flange Drilling

Working Pressure:

Up to 3 psig [0.207 barg]

Request data sheet: VRCMC-0311

Roof Manway Cover



Brand/Model:

Varec 220 Series

Features:

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

Sizes:

18", 20", 24", 30", 36"

Materials:

Cast Iron, Aluminum, Carbon Steel or 316 Stainless Steel base

Working Pressure:

Up to 1 psig [0.07 barg]

Request data sheet: VRCMC-0305

Specialty Valves

Brand/Model: **Anderson Greenwood Safety Selector Valve (SSV)**

Features: Developed to provide a safe and efficient method of switching from an active pressure relief valve to a stand-by pressure relief valve. The SSV has less than 3% pressure drop to the active API 526 PRV inlet in accordance with ASME Code Section VIII and API RP 520, Part II. Tandem Safety Selector Valve systems are available which allow positive and simultaneous switching of both inlet and outlet SSV's while maintaining overpressure protection at all times.

Sizes: 1" to 10"

Pressure Class: ANSI Class 150 to 2500

Maximum Temperature: 800°F [426°C]

Request data sheet: ANGMC-0241



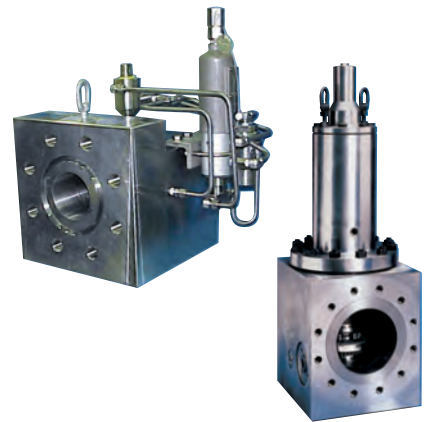
Brand/Model: **"BLK" BlockBody Pressure Relief Valves**

Features: Originally designed for offshore applications where set pressure requirements exceeded industry standards. Available in most Crosby and Anderson Greenwood Direct Spring Operated and Pilot Operated Pressure Relief Valve designs, the BlockBody will provide cost-effective alternatives to multiple high pressure smaller orifice relief valves. The standard forged body construction allows an extensive array of available metallurgy options.

Sizes: 1/2" x 3/4" to 8" x 10"

Set Pressures: To 10,000 psig [689 barg]

Contact your PVC sales representative for more information



Brand/Model: **Crosby Style PVR Pressure/ Vacuum Pressure Relief Valve**

Features: Designed for the food & beverage and pharmaceutical industries, the PVR relieves excess air or gas pressure, relieves excess liquid pressure in the absence of air or gas blanketing and prevents formation of a vacuum that could cause the vessel to buckle due to external pressure.

Sizes: 3" and 4"

Inlet Connections: Lug Union Nut, ANSI flanged, Tri-clamp

Set Pressures: 14.5 to 125 psig [1 to 8.62 barg]

Vacuum Relief (typical): 2" wc [5 mbarg]

Temperature Range: -15 to +400°F [+5 to +204°C]

Code: ASME VIII [15 psig and above]

Request data sheet: CROMC-0330





Specialty Valves

Brand/Model: **Anderson Greenwood Internal Tank Valve (ITV)**
Features: Liquid storage - LNG, LPG, NH₃, LOX, etc. The Internal Tank Valve is a fail-safe isolation valve for bottom and side withdrawal tanks.

Request data sheet: ANGMC-0245

Brand/Model: **Anderson Greenwood Reserve Capacity Relief Valve (RCRV)**

Features: 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.

Sizes: 24" and 36"

Flange Mounting: 24" = 150# Class/ANSI 16.5,
36" = 25# Class/ANSI 16.1

Set Pressure Range: 24": 1.5 to 5.0 psig [103 to 345 mbarg].
36": 1.5 to 3.0 psig [103 to 207 mbarg]

Request data sheet: ANGMC-0246



Certifications

- ASME Code Section I (V)
- ASME Code Section VIII (UV)
- Association of American Railroads
- Canadian Registration
- European Community (EC) Directive 94/9/EC
- Factory Mutual
- GGTN - GOSGORTEKHNADZOR of RUSSIA
- GOST (Russia)
- National Board of Boiler & Pressure Vessel Inspectors
- People's Republic of China
- Pressure Equipment Directive 97/23/EC
- Type Approvals
 - ABS
 - Bureau Veritas (BV)
 - Det Norske Veritas (DNV)
 - Nippon Kaiji Kyokai (NKK)
- Underwriters Laboratory
- EN ISO-4126

Nuclear Products

Model: Pressure Relief Valves

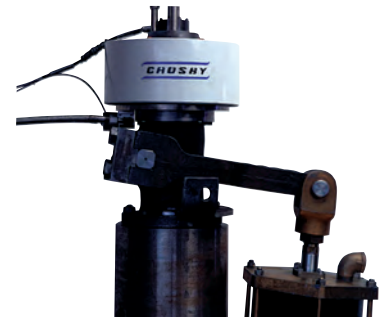
Features: Pentair Flow Control designs and manufactures pressure relief valves specifically to meet the exacting requirements of nuclear power plant applications built to ASME Code Section III. Our product portfolio includes Style HB-BP balanced design pressure relief valves used in pressurized water reactors throughout the world as well as Style HB-BP-DF dual function safety valves to meet special overpressure safety requirements of boiling water reactor primary loops. Style HA is intended for service on pressurized water reactors as the main steam safety valve. Other designs include styles JMB-WR, JO, JB, JWR-JO, JWR-JB, JMAK and JRAK-BS for balance of plant applications.



Testing and Verification Devices

Model: SPVD – Set Pressure Verification Device

Features: A system for in-site testing, classified as a “calibrated assist device” per ASME Performance Test Code (PTC 25). Totally automatic – computer driven system for testing safety valves. Available in portable or permanently mounted models.



Model: VPI – Valve Position Indicator

Features: Provides direct, continuous, remote indication of valve spindle position. Permits safe monitoring of pressure relief valves located in hostile environments. Transducer is qualified - Class 1E Standard system handles up to 20 Linear Variable Differential Transducers (LVDT) sensors. Qualified to IEEE-344 for in-containment service.

Models: LISA – Lift Indicating Switch Assembly

Features: A valve position indicating device with a movable permanent magnet attached to the valve spindle. Fixed “reed” type switches are permanently encased in epoxy in the switch housing. Two sets of switches provide redundancy, with each set consisting of three switches indicating valve closed, mid and fully-open positions. Qualified to IEEE-344.

Pentair PRV²SIZE



Pressure Relief Device Sizing and Selection Software

Pentair PRV²SIZE incorporates over 135 years of experience and engineering expertise for an extensive array of Anderson Greenwood, Crosby and Varec pressure relief devices and related products in one software package. With Pentair PRV²SIZE customers and engineers can address numerous applications in a single sizing and selection platform without the need to use two or more sizing programs.

Pentair PRV²SIZE features:

- Improved user interface
 - Sizing calculations can be saved at any point
 - Multiple tags can be opened at one time
- Capability of sorting data using a variety of parameters
- Fully configured product selection
- Industry standard sizing methodologies
- Drop-down boxes allow instantaneous change of sizing methodology from API to ASME and vice versa
- Addition of 2:1 elliptical head tanks for fire sizing applications
- Catalog integration from existing product literature PDF's
- Detailed product specifications including cross sectional drawings with dimensions and weights
 - U.S. Customary System and Metric units
- Improved tools to export and import device tag numbers with the ability to mail files directly from the software program
- Combination device, reaction force and noise level calculations
- Addition of flow curves for pressure and vacuum relief valves
- Individual capsule summaries of each product including an image of the selected product

Another unique feature of Pentair PRV²SIZE is its capability to provide sizing and selection for tank protection and tank blanketing products in a single software program. This includes pad and de-pad valves, tank blanketing regulators, pressure/vacuum vents and low pressure pilot operated relief valves.

Service Capabilities

Delivering factory-trained teams of mobile technicians 24/7/365, our fleet of fully stocked service vehicles allows us to work anywhere you need us - from the field to our own state-of-the-art production facilities. Our pickup and delivery services assist you with your service and repair needs with minimal downtime.

With a fleet of service vehicles and a trained team of expert technicians, Pentair provides a wide range of aftermarket services at customer locations. Some of the products or activities addressed onsite include:

- Boiler Safety Valves (protecting the Drum, Superheater, and Reheater)
- Boiler Level Gauges (Direct Reading)
- Pressure Relief Valves
- Control Valves
- Pump Protection Valves
- Specialty Gate, Globe, and Check Valves
- Wellheads
- Actuators and Controls
- Commissioning
- Nuclear Power Plant Services

Selection Matrix

	ASME Section VIII Gas/Vapor	ASME Section VIII Liquid	ASME Section VIII Steam	ASME Section I Steam	ASME Section III	Adjustable Blowdown	Fixed Blowdown	Metal Seats	Soft Seats	Pressure Relief	Vacuum Relief	Snap/Pop Action	Modulating Action
Conventional and Balanced Bellows API 526 Valves													
Crosby Style JOS-E	X	X				X	X	X	X	X			
Crosby Style JBS-E	X	X				X	X	X	X	X			
Crosby Style JLT-JOS-E	X	X				X	X	X	X	X			
Crosby Style JLT-JBS-E	X	X				X	X	X	X	X			
Portable/Threaded and Flanged Valves													
Anderson Greenwood Series 60	X						X	X	X	X			
Anderson Greenwood Series 80	X	X	X		X	X	X	X	X	X			
Crosby Series 800	X		X		X	X	X	X	X	X			
Crosby Series 900 OMNI-TRIM®	X	X	X		X	X	X	X	X	X			
Crosby Series BP OMNI-TRIM®	X	X					X	X	X	X			
Crosby Series 82	X						X	X	X	X			
Safety Valves													
Crosby Style HCI			X	X		X	X	X	X	X			
Crosby Style HE			X	X		X	X	X	X	X			
Crosby Style HSJ			X	X		X	X	X	X	X			
Crosby Style HL			X	X		X	X	X	X	X			
High Pressure Pilot Operated Valves													
Anderson Greenwood Series 200	X					X	X	X	X	X		X	
Anderson Greenwood Series 400	X	X					X	X	X	X			X
Anderson Greenwood Series 500	X	X	X				X	X	X	X			X
Anderson Greenwood Series 700	X		X			X	X	X	X	X		X	
Anderson Greenwood Series 800	X	X					X	X	X	X			X
Anderson Greenwood Series 5100				X			X	X	X	X			X
Anderson Greenwood Series 5200													
Low Pressure Pilot Operated Valves													
Anderson Greenwood Series 90	X					X	X	X	X	X		X	X
Anderson Greenwood Series 9000	X					X	X	X	X	X		X	X
Anderson Greenwood 96A (Vacuum Breaker)							X	X	X	X			X
Large Orifice Relief Valves													
Crosby Style JB-TD	X		X			X	X	X	X	X			

Selection Matrix

	Weight Loaded Pressure Relief	Weight Loaded Pressure & Vacuum Relief	Spring Loaded Pressure & Vacuum Relief	Weight Loaded Vacuum Relief	Spring Loaded Pressure Relief	Spring Loaded Vacuum Relief	Atmospheric Tank Venting	Emergency Pressure Relief Manway Cover	Emergency Vacuum Relief Manway Cover	Low Temperature Storage	Flame Arrester (Vertical Installation)	Flame Arrester (Horizontal Installation)	Roof Manway Cover	Sampling & Gauging Hatch Cover	Upstream Control Regulator	Downstream Control Regulator	Direct Spring Tank Blanketing	Right Angle Style Pilot Operated	Y Style Pilot Operated
Pressure/Vacuum Relief Valves																			
Varec 2010B/2020B Series		X																	
Varec 3500B/3600B/3650B Series	X			X															
Varec 7100B Series	X																		
Varec 2440/2450 Series			X																
Varec 4110A/3610/3660 Series	X					X													
Varec 711 Series					X														
Varec 7000 Series							X												
Emergency Vents																			
Varec 221P Series								X											
Varec 221PV Series								X	X										
Varec 4210A Series								X	X										
Anderson Greenwood RCRV										X									
Flame Arresters																			
Varec 5400A Series											X								
Varec 5000 Series											X								
Varec 5010 Series												X							
Combination Relief Valve with Flame Arrester																			
Varec 5810B/5820B Series		X									X								
Varec 5910B/5920B Series		X									X								
Tank Accessories																			
Varec 220 Series													X						
Varec 42 Series														X					
Varec 4310 Series														X					
Tank and Equipment Blanketing Systems																			
Varec Series 180/186															X				
Varec Series 181/187																X			
Anderson Greenwood Type BV-1																		X	
Anderson Greenwood Type RA																	X		
Anderson Greenwood Type Y1																			X



VALVES & CONTROLS

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