ASME Section I and VIII Steam, Air And Gas Service

CONBRACO

19/29 series bronze safety valves

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Warranty And Limitations Of Liability

Conbraco Industries, Inc. warrants, to its initial purchaser only, that its products which are delivered to this initial purchaser will be of the kind described in the order
or price list and will be free of defects in workmanship or material for a period of one year from the date of delivery to you, our initial purchaser.

Should any failure to conform to this warranty appear within one year after the date of the initial delivery to our initial purchaser, Conbraco will, upon written notification thereof and substantiation that the goods have been stored, installed, maintained and operated in accordance with Conbraco's recommendations and standard industry practice, correct such defects by suitable repair or replacement at Conbraco's own expense.

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY OF QUALITY, WHETHER EXPRESSED OR IMPLIED, EXCEPT THE WARRANTY OF TITLE AND AGAINST PATENT INFRINGEMENT. Correction of non-conformities, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of Conbraco to our initial purchaser, with respect to the goods, whether based on contract, negligence, strict tort or otherwise. It is the intention of Conbraco Industries, Inc. that no warranty of any kind, whether expressed or implied, shall pass through our initial purchaser to any other person or corporation.

LIMITATION OF LIABILITY: Conbraco Industries, Inc. SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES SUCH AS, BUT NOT LIMITED TO, DAMAGES OR LOSS OF OTHER PROPERTY OR EQUIPMENT, LOSS OF PROFITS OR REVENUE, COST OF CAPITAL, COST OF PURCHASED OR REPLACEMENT GOODS, OR CLAIMS OF CUSTOMERS OF OUR INITIAL PURCHASER. THE REMEDIES OF OUR INITIAL PURCHASER, AND ALL OTHERS, SET FORTH HEREIN ARE EXCLUSIVE, AND THE LIABILITY OF CONBRACO WITH RESPECT TO SAME SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE GOODS UPON WHICH SUCH LIABILITY IS BASED.

A Full Range Of Safety & Safety Relief Valves With US-Made Quality

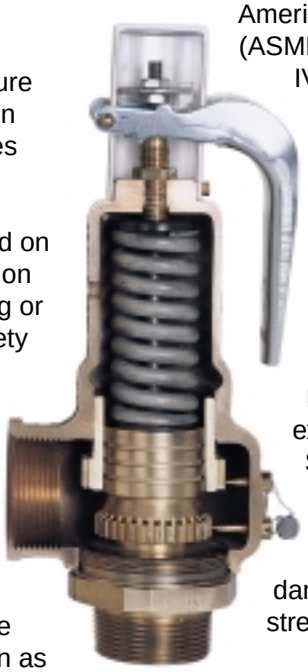
Conbraco produces both safety and safety relief valves for steam, air and gas applications. The valves in this brochure, the 19 and 29 Series, are safety valves.

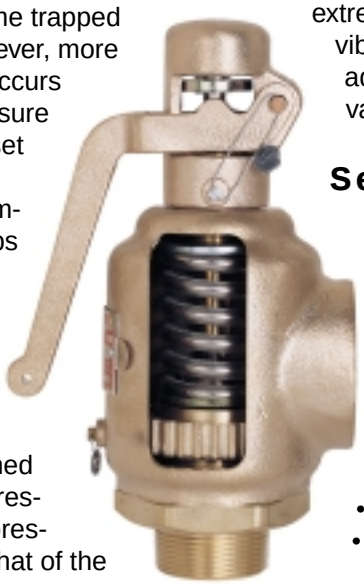
Safety Valve Basics

Safety or pop safety valves are pressure relief valves actuated by an increase in upstream static pressure. These valves are used primarily for overpressure in processes which generate or contain steam, air or gas. Since most are used on compressible fluids, their opening action is characterized by a rapid full opening or "pop" action. Hence the term 'pop safety valve'.

During an over pressure excursion the valve will begin to simmer as the system pressure approaches the set pressure of the safety valve. Simmer is the audible, and sometimes visible, escape of fluid through the valve seat and only applies to valves on compressible fluid service. Simmer is often mistaken as a characteristic of a defective safety valve, and may very well be if the seat has been damaged or if debris has become trapped between seating surfaces. However, more often than not, simmer simply occurs because system operating pressure is too close to the safety valve set point. The various ASME Code sections have established recommended operating pressure gaps which should be maintained between maximum operating system pressure and safety valve set point for various applications.

Safety valves open immediately once set pressure is reached and remain open until excess pressure is exhausted and system pressure subsides to a level below that of the safety valve. The valve then reseats.





Consider Established Standards

Pressure relief valve performance standards regarding design, performance and certification are covered in codes developed by the American Society of Mechanical Engineers (ASME) in Section I (for power boilers); Section IV (for heating boilers), and Section VIII (for pressure vessels).

Knowing Your Pressure Requirements

Over-pressure protection is the sole job of a Conbraco pressure relief valve. It is not designed for use as a control device or pressure regulator! At a minimum, the valve should be set at the greater of 5 PSIG or 10% higher than the maximum expected operating system pressure. Setting the pressure at less a differential could cause leaking or accidental actuation of the valve. Inadvertent valve actuation can lead to leakage if its seats are damaged by foreign matter in the flow stream.

Helpful Hint: If you're planning an installation under unusual conditions – temperature extremes, system pulsations or anticipated vibrations – contact Conbraco for technical advice on selecting the right pressure relief valve size and design for your application.

Selecting The Right Pressure Relief Valve

To assist with proper selection, the following information should be noted:

- Type of service (water, steam or air, or gas.)
- Set pressure (PSIG)
- Discharge capacity (LBS/HOUR, SCFM or BTU/HR)
- Connection sizes
- Fluid Temperature
- Code symbols: V, UV, HV

The complete nameplate data is critical to Conbraco when selecting the right replacement valve.

Planning Your Installation

Install the Conbraco pressure relief valve upright with the spindle vertical. ASME Section I models must be connected to the boiler independent of any other connection and as close to the boiler or normal steam flow path as possible without unnecessary intervening pipe or fittings. Make sure any intervening pipe or fitting is not longer than the face-to-face dimension of the corresponding tee fitting of the same diameter and pressure rating.

For ASME Section VIII service, the valve should be connected to the vessel in the vapor space above any contained liquid or to piping connected to the vapor space in the vessel which is to be protected. The connection between the valve and boiler or vessel shall have an area at least equal to the valve inlet. (Stop valves are not permitted between the vessel and safety/relief valve and the discharge to atmosphere except per ASME Section VIII UG-135 (d).

Discharge lines from the pressure relieving device shall be at least the same size as the valve outlet and as short and direct as possible. Discharge lines shall prevent liquid from collecting in the discharge side of the valve and must be directed to a safe discharge area. The valve body drain and vent holes must not be plugged. Consider both the weight of the discharge pipe and the reaction forces generated by discharging. Adequately supported discharge piping relieves stress on the valve. (The use of a Conbraco drip pan elbow is highly recommended).

Remember to free the valve of all packaging materials and remove dirt, sediment and scale from the inlet threads and nozzle bore prior to installation.

Keep operating pressure of the system at least 10 percent (or 5 psi, whichever is greater) below the set pressure of the valve to assure seat tightness. Note: These are general guidelines only, and it is the responsibility of the user to ensure the installation is in accordance with ASME Code and jurisdictional requirements.

Scheduled Maintenance

Conbraco pressure relief valves are 100% tested and then sealed to prevent unauthorized adjustment or repair. All warranties are void if the seals are broken.

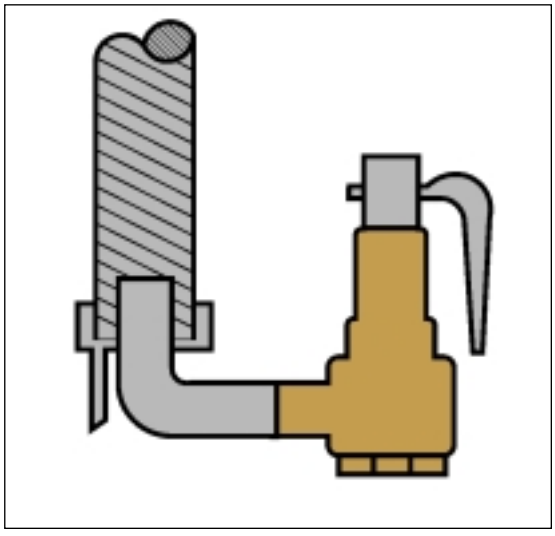
Valves should be inspected regularly to assure continued safe operation and long service life. A visual inspection is recommended at two month intervals while in service, followed by a complete pressure test at least once per year. Pressure testing prior to bringing down the boiler or systems is suggested so that needed service or repairs can be made if required.

These valves can be operated manually by means of the test lever when the system pressure is at least 75% of the set pressure, or the system pressure may be carefully increased until the valve operates.

Any valve that fails to open at the nameplate set pressure or fails to open or close properly must be removed from the vessel for replacement or repair. Never attempt to stop leakage by compressing the spring or gagging the valve! For resetting, adjustment or repairs contact Conbraco for the name of competent, authorized personnel who are familiar with the servicing of our safety valves. Use only authentic unmodified Conbraco replacement parts to maintain original performance.

Listen: It's Working!

As a pressure relief valve nears its pre-set pressure, it emits a "weep" or "simmer" as small amounts of steam or air manage to escape the valve seat. Simmering shows the relief valve is working as designed; that the valve is ready to pop open with discharge.



ASME Codes

ASME Section I, Power Boilers

Opening Pressure Tolerances
From 15 PSI to 70 PSI = plus/minus 2 PSI
From 71 PSI to 300 PSI = plus/minus 3%

Blowdown (Closing Pressure)
After blowing down, all valves shall close at a pressure not greater than that specified in the following table:

Set Pressure, psig	Maximum Blowdown
15 to 66	4 psi
67 to 250	6% of set pressure

The minimum blowdown for all safety valves shall be 2 psi or 2% of the set pressure, whichever is greater.

Seat Tightness
A tightness test shall be conducted at the maximum expected operating pressure, but at a pressure not exceeding the reseating pressure of the valve. When testing, a valve exhibiting no visible signs of leakage shall be considered adequately tight.

Recommended Operating Gap
For boilers having design pressures over 15 psig but not exceeding 300 psig, the minimum recommended differential between system operating and valve set pressure is 10% of design pressure, but not less than 7 psig.

Section VIII, Pressure Vessels

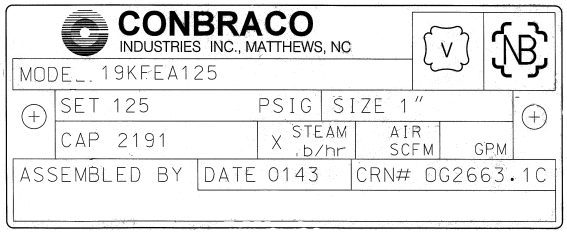
Opening Pressure Tolerances
From 15 PSI to 70 PSI: plus/minus 2 PSI
From 71 PSI to 300 PSI: plus/minus 3%

Blowdown
Section VIII does not specify a blowdown requirement for production testing by the valve manufacturer or assembler. Conbraco pressure relief valves which have adjustable blowdowns are capable of being set for 5% blowdown on compressible fluids. The user should specify blowdown based upon reclosing the valve above the normal system operating pressure.

Seat Tightness
A tightness test shall be conducted using steam, air or water as appropriate for the type of service. Test methods and acceptance criteria shall be in accordance with industry standards or API 527 as applicable.

Recommended Minimum Operating Gap
Set pressures to 70 PSI: 5 PSI minimum operating differential. Valve set pressures above 70 PSI: minimum 10% of pressure setting.

Importance Of Markings
Conbraco safety valves bear a variety of markings which indicate performance, testing and quality status. These markings may include the following:



"V" Symbol in ASME Cloverleaf... Signifies the Conbraco Safety Valve has been designed, manufactured and tested in accordance with Section I of the ASME Code and is approved for use on power boilers.

"UV" Symbol in ASME Cloverleaf... Signifies the Conbraco Safety valve has been designed, manufactured and tested in accordance with Section VIII of the ASME Code and is approved for use on unfired pressure vessels and pressure piping systems.

NB Symbol... indicates the capacity value stamped on the nameplate has been certified by the National Board of Boiler and Pressure Vessel inspectors.

CRN Number... Design registration number in accordance with CSA B51, the Canadian Boiler, Pressure Vessel and Pressure Piping Code. Conbraco Safety valves are registered in every Canadian Province and Territory.

Assembled By... Indicates the valve was assembled and tested by an authorized Conbraco assembler. These assemblers are factory trained and ASME authorized to set, service and repair Conbraco Safety Valves.

Bronze High Pressure Safety Valves For Steam, Air & Gas

ASME Sections I and VIII

Conbraco 19 Series is a dependable cast bronze high capacity safety valve ideal for use on all types of boilers, piping systems and unfired pressure vessels. This rugged design features improved alignment for enhanced performance and reliability. Other features now available include optional metal seating, stainless steel wetted trim in all sizes, and a new, more descriptive model numbering system. Flow ratings are National Board certified in accordance with ASME Sections I and VIII.

Applications:

Overpressure protection of steam boilers, sterilizers, distillers, and cookers. Pneumatic conveying equipment, air compressors, receivers and dryers. Steam, air and gas accumulators, pressure vessels and pressure piping systems.

Features:

- Stainless steel springs are standard
- Teflon® PFA seat resists corrosive boiler chemicals* and excessive vibration
- Set pressures to 250 PSIG Steam/ 300 PSIG Air & Gas @ 406°F maximum
- Inlet sizes: 1/2” to 2-1/2” NPT
- High-capacity full nozzle design available in 6 orifice sizes
- Two control rings for maximum performance & adjustability
- Short “tuned” blow down minimizes product loss
- Tapped body drain allows piping of condensate away from equipment
- Reduced repair costs: soft seat easily replaced
- Registered in all Canadian Provinces under CSA B51 CRN OG2663.1C

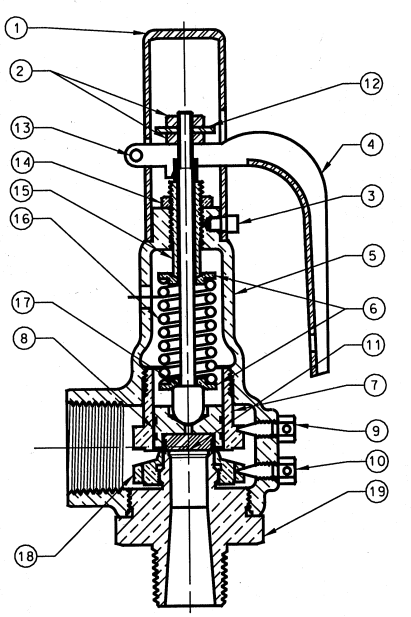
Available Options:

- Metal to metal seating
- Steam set pressures to 300 psi @ 422˚F (Model 19S, stainless steel trim).
- 316 stainless steel wetted trim available for all sizes
- Anti-vibration dampened lifting lever
- Oxygen cleaning

*Teflon® is a registered trademark of Dupont

19 Series

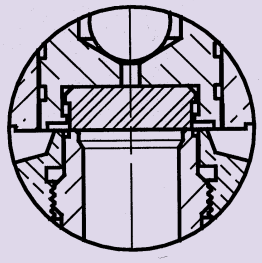
19 Series Bronze Safety Valves Materials



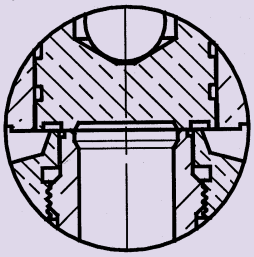
19 Series-Open Lever
(standard)

Item	Component	Material 19K, 19M	Material 19L, 19S
1	CAP	BRASS	BRASS
2	STEM NUT (2)	STEEL - PLATED	STEEL - PLATED
3	CAP LOCK SCREW	BRASS	BRASS
4	LIFT LEVER	STEEL - PLATED	STEEL - PLATED
5	BODY	BRONZE	BRONZE
6	SPRING WASHER (2)	BRASS	BRASS
7	GUIDE RING	BRASS	BRASS
8	DISC	BRASS	STAINLESS STEEL
9	GUIDE RING SCREW	BRASS	BRASS
10	NOZZLE RING SCREW	BRASS	BRASS
11	SEAT INSERT-19K &19L	PFA TEFLON®	PFA TEFLON®
12	LIFT WASHER	STEEL - PLATED	STEEL - PLATED
13	LEVER PIN	STEEL - PLATED	STEEL - PLATED
14	ADJUSTING SCREW LOCKNUT	STEEL - PLATED	STEEL - PLATED
15	ADJUSTING SCREW	BRASS	BRASS
16	SPRING	STAINLESS STEEL	STAINLESS STEEL
17	STEM	STEEL / BRASS	STEEL / BRASS
18	NOZZLE RING	BRASS	BRASS
19	NOZZLE	BRASS	STAINLESS STEEL
-	NAMEPLATE	STAINLESS STEEL	STAINLESS STEEL

Seat Detail



Soft Seat Design
Model 19K-Brass
Model 19L-Stainless



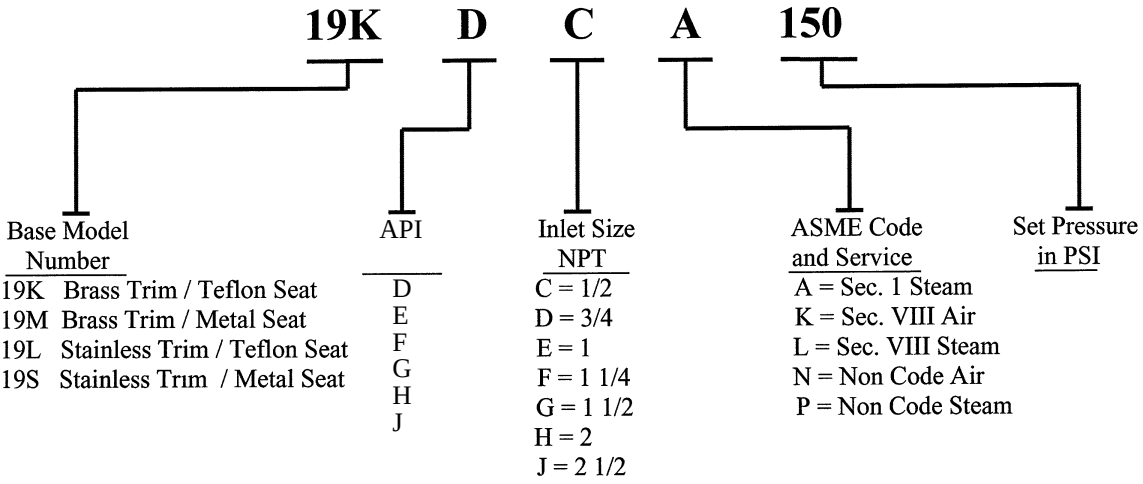
Metal-to-Metal Seat Design
Model 19M-Brass
Model 19S-Stainless

Now 4 trim styles to choose from:

Series	19K	19M	19L	19S
Trim	Brass	Brass	Stainless Steel	Stainless Steel
Seat	PFA Teflon®	Metal to Metal	PFA Teflon®	Metal to Metal
Max. Set - Steam	250 PSI	250 PSI	250 PSI	300 PSI
Max. Set - Air/Gas	300 PSI	300 PSI	300 PSI	300 PSI
Max. Temperature	406°F	406°F	406°F	422°F

Model Numbering System

19 Series Model Number Update



Correction Factors for Air and Gas Service

Temperature Correction

To correct for temperatures other than 60°F at the inlet of the valve, multiply the SCFM from the capacity tables by factor Kt.

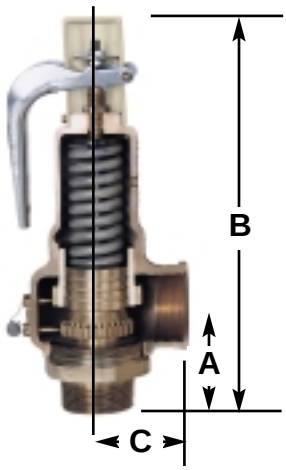
Temp.°F	Kt	Temp.°F	Kt	Temp.°F	Kt
0	1.063	90	.972	260	.850
10	1.052	100	.964	280	.838
20	1.041	120	.947	300	.827
30	1.030	140	.931	320	.816
40	1.020	160	.916	340	.806
50	1.010	180	.901	360	.796
60	1.000	200	.888	380	.787
70	.991	220	.874	400	.778
80	.981	240	.862	420	.769

Specific Gravity Correction

To correct for specific gravities other than air (=1.0), multiply the SCFM from the capacity tables by factor Ksg.

Specific Gravity	Ksg	Specific Gravity	Ksg	Specific Gravity	Ksg
.10	3.160	.75	1.555	1.20	.913
.20	2.240	.80	1.117	1.25	.895
.30	1.825	.85	1.085	1.30	.877
.40	1.580	.90	1.055	1.40	.845
.50	1.414	.95	1.025	1.50	.817
.55	1.350	1.00	1.000	1.60	.791
.60	1.290	1.05	.975	1.70	.768
.65	1.240	1.10	.955	1.80	.745
.70	1.195	1.15	.933	1.90	.725

19 Series Bronze Safety Valves



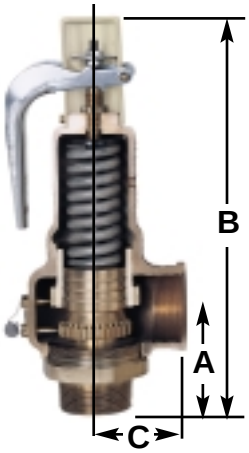
Old Part No.	New Model No.	Orifice Desig.	Size Inlet x Outlet	A	B	C	Weight Each
19-202	19*DC	D	1/2 X 3/4	1-3/4	6-1/8	1-3/8	1.5
19-301	19*DD	D	3/4 X 3/4	1-7/8	6-3/16	1-3/8	1.5
19-302	19*ED	E	3/4 X 1	1-15/16	6-5/8	1-3/4	1.9
19-401	19*EE	E	1 X 1	2-1/16	6-3/4	1-3/4	2.1
19-402	19*FE	F	1 X 1-1/4	2-3/8	8-3/4	2	3.9
19-501	19*GF	F	1-1/4 X 1-1/4	2-7/16	8-7/8	2	4.1
19-502	19*GG	G	1-1/4 X 1-1/2	2-11/16	10-3/16	2-3/8	6.9
19-601	19*HG	G	1-1/2 X 1-1/2	2-3/4	10-1/4	2-3/8	7.1
19-602	19*HH	H	1-1/2 X 2	3-1/16	11-5/16	2-3/4	11.2
19-701	19*HH	H	2 X 2	3-1/8	11-3/8	2-3/4	11.3
19-702	19*JH	J	2 X 2-1/2	3-7/16	13-5/8	3-1/2	19.2
19-801	19*JJ	J	2-1/2 X 2-1/2	3-13/16	14	3-1/2	19.8

*Specify trim letter (see page 8)

"V" Steam
ASME Section I – Power Boilers

Set Pressure P.S.I.G.	90% OF ACTUAL CAPACITY AT 3% ACCUMULATION CAPACITY IN POUNDS OF SATURATED STEAM PER HOUR									
	VALVE SIZE 1/2 x 3/4 3/4 x 3/4	ORIFICE DESIGNATION "D" .405 Area in2	VALVE SIZE 3/4 x 1 1 x 1	ORIFICE DESIGNATION "E" .541 Area in2	VALVE SIZE 1 x 1-1/4" 1-1/4" x 1-1/4"	ORIFICE DESIGNATION "F" .676 Area in2	VALVE SIZE 1-1/4" x 1-1/2" 1-1/2" x 1-1/2"	ORIFICE DESIGNATION "G" .866 Area in2	VALVE SIZE 1-1/2" x 2" 2 x 2	ORIFICE DESIGNATION "H" 1.082 Area in2	VALVE SIZE 2 x 2-1/2" 2-1/2" x 2-1/2"	ORIFICE DESIGNATION "J" 1.386 Area in2
15	174		310		484		794		1240		2035	
20	201		359		561		920		1435		2356	
25	229		408		637		1045		1631		2677	
30	256		457		713		1170		1826		2998	
35	284		506		790		1296		2022		3319	
40	311		555		866		1421		2217		3641	
45	339		604		942		1546		2413		3962	
50	366		653		1019		1672		2608		4283	
55	394		702		1095		1797		2804		4604	
60	421		751		1172		1922		2999		4925	
65	448		800		1248		2048		3195		5246	
70	476		849		1326		2175		3394		5573	
75	505		900		1405		2304		3596		5904	
80	533		950		1483		2433		3797		6234	
85	561		1001		1562		2563		3998		6565	
90	590		1051		1641		2692		4200		6896	
95	618		1101		1719		2821		4401		7226	
100	646		1152		1798		2950		4602		7557	
105	674		1202		1877		3079		4804		7888	
110	703		1253		1955		3208		5005		8218	
115	731		1303		2034		3337		5207		8549	
120	759		1353		2113		3466		5408		8880	
125	787		1404		2191		3595		5609		9210	
130	816		1454		2270		3724		5811		9541	
135	844		1505		2349		3853		6012		9872	
140	872		1555		2427		3982		6213		10202	
145	900		1605		2506		4111		6415		10533	
150	929		1656		2585		4240		6616		10864	
160	985		1757		2742		4499		7019		11525	
165	383		683		1067		1750		2731		4484	
170	1042		1857		2899		4757		7422		12186	
180	1098		1958		3057		5015		7824		12848	
190	1155		2059		3214		5273		8227		13509	
200	1211		2160		3371		5531		8630		14170	
210	1268		2261		3529		5789		9033		14832	
220	1324		2361		3686		6047		9436		15493	
230	1381		2462		3843		6305		9838		16154	
240	1438		2563		4001		6564		10241		16816	
250	1494		2664		4158		6822		10644		17477	
255	1522		2714		4237		6951		10845		17808	
260	1551		2765		4315		7080		11047		18138	
265	1579		2815		4394		7209		11248		18469	
270	1607		2865		4473		7338		11449		18800	
275	1635		2916		4551		7467		11651		19130	
280	1664		2966		4630		7596		11852		19461	
285	1692		3017		4709		7725		12053		19792	
290	1720		3067		4787		7854		12255		20122	
295	1748		3117		4866		7983		12456		20453	
300	1777		3168		4945		8112		12658		20784	
Approx.1 PSI. Increments.	5.7		10.0		15.6		25.8		40.2		66.0	

19 Series Bronze Safety Valves



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19-301	19*DD	D	3/4 X 3/4	1-7/8	6-3/16	1-3/8	1.5
19-302	19*ED	E	3/4 X 1	1-15/16	6-5/8	1-3/4	1.9
19-401	19*EE	E	1 X 1	2-1/16	6-3/4	1-3/4	2.1
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19-701	19*HH	H	2 X 2	3-1/8	11-3/8	2-3/4	11.3
19-702	19*JH	J	2 X 2-1/2	3-7/16	13-5/8	3-1/2	19.2
19-801	19*JJ	J	2-1/2 X 2-1/2	3-13/16	14	3-1/2	19.8

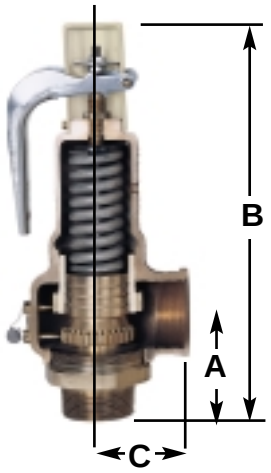
*Specify trim letter (see page 8)

"UV" Steam
ASME Section VIII – Pressure Vessels

Set Pressure P.S.I.G.	90% OF ACTUAL CAPACITY AT 10% ACCUMULATION CAPACITY IN POUNDS OF SATURATED STEAM PER HOUR									
	VALVE SIZE 1/2 x 3/4 3/4 x 3/4	ORIFICE DESIGNATION "D" .405 Area in2	VALVE SIZE 3/4 x 1 1 x 1	ORIFICE DESIGNATION "E" .541 Area in2	VALVE SIZE 1 x 1-1/4" 1-1/4" x 1-1/4"	ORIFICE DESIGNATION "F" .676 Area in2	VALVE SIZE 1-1/4" x 1-1/2" 1-1/2" x 1-1/2"	ORIFICE DESIGNATION "G" .866 Area in2	VALVE SIZE 1-1/2" x 2" 2 x 2	ORIFICE DESIGNATION "H" 1.082 Area in2	VALVE SIZE 2 x 2-1/2" 2-1/2" x 2-1/2"	ORIFICE DESIGNATION "J" 1.386 Area in2
15	179		320		499		820		1279		2100	
20	207		369		576		945		1474		2421	
25	234		418		652		1070		1670		2742	
30	262		467		729		1195		1865		3063	
35	292		521		813		1333		2080		3416	
40	322		574		897		1471		2295		3769	
45	352		628		981		1609		2510		4122	
50	383		682		1065		1747		2725		4475	
55	413		736		1149		1885		2941		4828	
60	443		790		1233		2022		3156		5181	
65	473		844		1317		2160		3371		5535	
70	503		897		1401		2298		3586		5888	
75	534		951		1485		2436		3801		6241	
80	564		1005		1569		2574		4016		6594	
85	594		1059		1653		2712		4231		6947	
90	624		1113		1737		2849		4446		7300	
95	654		1167		1821		2987		4661		7653	
100	684		1220		1905		3125		4876		8007	
105	715		1274		1989		3263		5091		8360	
110	745		1328		2073		3401		5306		8713	
115	775		1382		2157		3539		5521		9066	
120	805		1436		2241		3677		5736		9419	
125	835		1489		2325		3814		5951		9772	
130	866		1543		2409		3952		6167		10125	
135	896		1597		2493		4090		6382		10479	
140	926		1651		2577		4228		6597		10832	
145	956		1705		2661		4366		6812		11185	
150	986		1759		2745		4504		7027		11538	
160	1047		1866		2913		4779		7457		12244	
170	1107		1974		3081		5055		7887		12951	
180	1167		2082		3249		5331		8317		13657	
190	1228		2189		3417		5606		8747		14363	
200	1288		2297		3585		5882		9177		15069	
210	1349		2405		3753		6158		9608		15776	
220	1409		2512		3921		6433		10038		16482	
230	1469		2620		4089		6709		10468		17188	
240	1530		2727		4257		6985		10898		17894	
250	1590		2835		4425		7260		11328		18601	
255	1620		2889		4509		7398		11543		18954	
260	1651		2943		4593		7536		11758		19307	
265	1681		2997		4677		7674		11973		19660	
270	1711		3050		4761		7812		12188		20013	
275	1741		3104		4845		7950		12403		20366	
280	1771		3158		4929		8087		12618		20720	
285	1801		3212		5013		8225		12834		21073	
290	1832		3266		5097		8363		13049		21426	
295	1862		3320		5181		8501		13264		21779	
300	1892		3373		5265		8639		13479		22132	
Approx.1 PSI. Increments.	6.0		10.8		16.8		27.6		43.0		70.6	

Note: Specify model 19S with stainless steel wetted trim for steam settings beyond 250 psig.

19 SERIES BRONZE SAFETY VALVES



Old Part No.	New Model No.	Orifice Desig.	Size Inlet x Outlet	A	B	C	Weight Each
19-202	19*DC	D	1/2 X 3/4	1-3/4	6-1/8	1-3/8	1.5
19-301	19*DD	D	3/4 X 3/4	1-7/8	6-3/16	1-3/8	1.5
19-302	19*ED	E	3/4 X 1	1-15/16	6-5/8	1-3/4	1.9
19-401	19*EE	E	1 X 1	2-1/16	6-3/4	1-3/4	2.1
19-402	19*FE	F	1 X 1-1/4	2-3/8	8-3/4	2	3.9
19-501	19*FF	F	1-1/4 X 1-1/4	2-7/16	8-7/8	2	4.1
19-502	19*GF	G	1-1/4 X 1-1/2	2-11/16	10-3/16	2-3/8	6.9
19-601	19*GG	G	1-1/2 X 1-1/2	2-3/4	10-1/4	2-3/8	7.1
19-602	19*HG	H	1-1/2 X 2	3-1/16	11-5/16	2-3/4	11.2
19-701	19*HH	H	2 X 2	3-1/8	11-3/8	2-3/4	11.3
19-702	19*JH	J	2 X 2-1/2	3-7/16	13-5/8	3-1/2	19.2
19-801	19*JJ	J	2-1/2 X 2-1/2	3-13/16	14	3-1/2	19.8

*Specify trim letter (see page 8)

"UV" Air
ASME Section VIII – Pressure Vessels

Set Pressure P.S.I.G.	90% OF ACTUAL CAPACITY AT 10% ACCUMULATION CAPACITY IN CUBIC FEET OF OF AIR PER MINUTE AT 14.7 P.S.I.A. - 60 DEGREES F°									
	VALVE SIZE 1/2 x 3/4 3/4 x 3/4	ORIFICE DESIGNATION "D" .405 Area in2	VALVE SIZE 3/4 x 1 1 x 1	ORIFICE DESIGNATION "E" .541 Area in2	VALVE SIZE 1 x 1-1/4" 1-1/4" x 1-1/4"	ORIFICE DESIGNATION "F" .676 Area in2	VALVE SIZE 1-1/4" x 1-1/2" 1-1/2" x 1-1/2"	ORIFICE DESIGNATION "G" .866 Area in2	VALVE SIZE 1-1/2" x 2" 2 x 2	ORIFICE DESIGNATION "H" 1.082 Area in2	VALVE SIZE 2 x 2-1/2" 2-1/2" x 2-1/2"	ORIFICE DESIGNATION "J" 1.386 Area in2
15	64		114		178		292		455		747	
20	74		131		205		336		525		862	
25	83		149		232		381		594		976	
30	93		166		259		426		664		1090	
35	104		185		289		475		740		1216	
40	115		204		319		524		817		1342	
45	125		224		349		573		894		1467	
50	136		243		379		622		970		1593	
55	147		262		409		671		1047		1719	
60	158		281		439		720		1123		1844	
65	168		300		469		769		1200		1970	
70	179		319		499		818		1276		2096	
75	190		339		528		867		1353		2221	
80	201		358		558		916		1429		2347	
85	211		377		588		965		1506		2473	
90	222		396		618		1014		1583		2598	
95	233		415		648		1063		1659		2724	
100	244		434		678		1112		1736		2850	
105	254		454		708		1161		1812		2976	
110	265		473		738		1211		1889		3101	
115	276		492		768		1260		1965		3227	
120	287		511		798		1309		2042		3353	
125	297		530		828		1358		2118		3478	
130	308		549		857		1407		2195		3604	
135	319		568		887		1456		2271		3730	
140	330		588		917		1505		2348		3855	
145	340		607		947		1554		2425		3981	
150	351		626		977		1603		2501		4107	
160	373		664		1037		1701		2654		4358	
165	83		683		1067		1750		2731		4484	
170	394		703		1097		1799		2807		4610	
180	416		741		1156		1897		2960		4861	
190	437		779		1216		1996		3114		5112	
200	459		818		1276		2094		3267		5364	
210	480		856		1336		2192		3420		5615	
220	502		894		1396		2290		3573		5867	
230	523		932		1456		2388		3726		6118	
240	545		971		1515		2486		3879		6369	
250	566		1009		1575		2584		4032		6621	
260	587		1047		1635		2682		4185		6872	
270	609		1086		1695		2781		4338		7124	
280	630		1124		1755		2879		4491		7375	
290	652		1162		1814		2977		4645		7626	
300	673		1201		1874		3075		4798		7878	
Approx.1 PSI. Increments.	2.2		3.8		6.0		9.8		15.2		25.1	

To correct for specific gravities other than air (=1.0), multiply the SCFM from the capacity tables by factor K_{sg} (see page 8 for more information).

OEM-Style Bronze Safety Valve For Steam, Air and Gas

ASME Sections I and VIII

Conbraco 29 Series is ideally suited for OEM applications where compact size, dependable performance and maximum economy are required. These rugged safety valves feature a top guided design and patented “soft-seat” for dramatically reduced seat leakage. Flow ratings are National Board certified in accordance with ASME Sections I and VIII.

Applications:

Small to medium sized steam power boilers, sterilizers and distillers, air compressors and receivers, pressure vessels and pressure piping systems.

Features:

- Stainless steel springs are standard
- Teflon® PFA seat resists corrosive boiler chemicals*
- Pressure settings from 30 to 200 PSIG
- Inlet sizes: 3/8” to 1-1/4” NPT
- Rust-proofed steel stem and spring washers
- Lower control ring permits blowdown adjustment
- Tapped body drain allows piping of condensate away from equipment
- Reduced repair costs; soft seat easily replaced
- Registered in all Canadian Provinces under CSA B51 CRN OG2663.1C

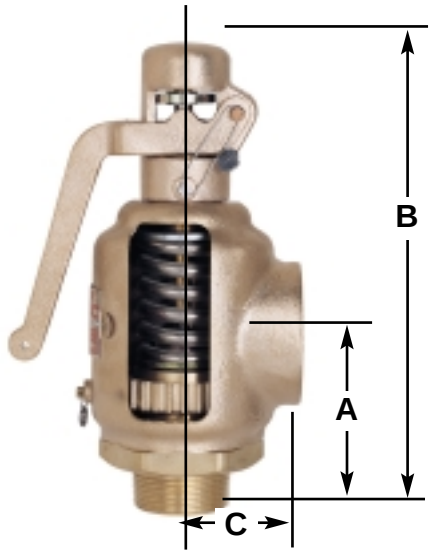
Available Options:

- 316 Stainless steel wetted trim (29-202 & 29-303 sizes only)
- Oxygen cleaning
- Rough or polished chrome plating of body, nozzle and cap

* Teflon® is a registered trademark of DuPont

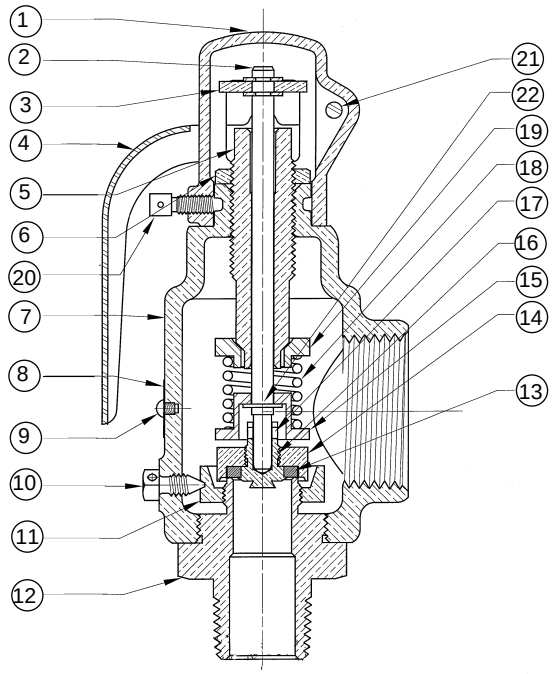
29 Series

29 SERIES BRONZE SAFETY VALVES



Dimensions

Valve No.	Size Inlet x Outlet	A	B	C	Weight Each
29-102	3/8 X 1	2-1/8	5-13/32	1-1/4	1.30
29-202	1/2 X 1	2-1/8	5-13/32	1-1/4	1.30
29-302	3/4 X 1	2-1/8	5-13/32	1-1/4	1.30
29-303	3/4 X 1-1/4	2-3/4	7-1/4	1-11/16	1.30
29-402	1 X 1-1/4	2-3/4	7-1/4	1-11/16	1.30
29-501	1-1/4 X 1-1/4	2-3/4	7-1/4	1-11/16	1.30



Materials

ITEM	COMPONENT	MATERIAL
1	CAP	BRONZE
2	STEM	STEEL - PLATED
3	LIFT WASHER	STEEL - PLATED
4	LIFT LEVER	STEEL - PLATED
5	ADJUSTING SCREW	BRASS
6	LOCK NUT	BRASS
7	BODY	BRONZE
8	NAMEPLATE	ALUMINUM
9	DRIVE SCREWS	STEEL - PLATED
10	SET SCREW	BRASS
11	BLOWDOWN RING	BRASS
12	NOZZLE*	BRASS
13	SEAT INSERT	TEFLON® PFA
14	DISC HOLDER	BRASS
15	LOWER WASHER	STEEL - PLATED
16	SEAT RETAINER*	BRASS
17	STEM PIN	STAINLESS STEEL
18	SPRING	STAINLESS STEEL
19	UPPER WASHER	STEEL - PLATED
20	LOCK SCREW	STEEL - PLATED
21	LEVER PIN	STEEL - PLATED
22	RETAINING RING	STAINLESS STEEL
-	SEAL & WIRE	LEAD/STEEL

* Optional stainless steel wetted trim for models 29-202XXL and 29-302XXL.
Items 12 & 16 are type 316 stainless steel.

29 SERIES ASME SAFETY VALVES

Steam And Air Ratings

CAPACITIES CERTIFIED BY NATIONAL BOARD OF BOILER & PRESSURE VESSEL INSPECTORS

(V) - ASME SECTION I POWER BOILER CODE, LBS/HR STEAM AT 3% OR 2 PSI ACCUMULATION

(UV) - ASME SECTION VIII PRESSURE VESSEL CODE, LBS/HR STEAM OR SCFM AIR AT 10% OR 3 PSI accumulation

All ratings are 90% of actual tested average capacity

Set Pressure PSIG	Model No. 29-102 29-202 29-302 Steam Lbs/Hr. (V)	Valve Size 3/8" x 1" 1/2" x 1" 3/4" x 1" Steam Lbs/Hr. (UV)	Seat Dia. 1/2" Air SCFM (UV)	Model No. 29-303 29-402 29-501 Steam Lbs/Hr. (V)	Valve Size 3/4" x 1 1/4" 1" x 1 1/4" 1-1/4" x 1-1/4" Steam Lbs/Hr. (UV)	Seat Dia. 3/4" Air SCFM (UV)
30	164	172	61	330	345	123
35	182	191	68	367	385	137
40	201	211	75	404	424	151
45	220	231	82	441	464	165
50	238	251	89	479	504	179
55	257	270	96	516	544	193
60	275	290	103	553	583	208
65	294	310	110	590	623	222
70	312	330	117	628	663	236
75	331	350	124	665	703	250
80	349	369	131	702	743	264
85	368	389	138	739	782	278
90	386	409	145	777	822	292
95	405	429	152	814	862	307
100	423	448	159	851	902	321
105	442	468	166	888	941	335
110	460	488	173	925	981	349
115	479	508	181	963	1021	363
120	497	528	188	1000	1061	377
125	516	547	195	1037	1100	391
130	534	567	202	1074	1140	406
135	553	587	209	1112	1180	420
140	571	607	216	1149	1220	434
145	590	626	223	1186	1259	448
150	608	646	230	1223	1299	462
155	627	666	237	1261	1339	476
160	645	686	244	1298	1379	490
165	664	706	251	1335	1419	505
170	683	725	258	1372	1458	519
175	701	745	265	1409	1498	533
180	720	765	272	1447	1538	547
185	738	785	279	1484	1578	561
190	757	804	286	1521	1617	575
195	775	824	293	1558	1657	589
200	794	844	300	1596	1697	604
APPROX. 1PSI. INCR.	3.7	3.95	1.4	7.4	8.00	2.8

KEY

PRESSURE P.S.I.	SUFFIX NUMBER
30	-07
35	-08
40	-09
45	-10
50	-11
55	-12
60	-13
65	-14
70	-15
75	-16
80	-17
85	-18
90	-19
95	-20
100	-21
105	-22
110	-23
115	-24
120	-25
125	-30
130	-31
135	-32
140	-33
145	-34
150	-35
155	-36
160	-37
165	-38
170	-39
175	-40
180	-41
185	-42
190	-43
195	-44
200	-45

Special settings available upon request

OPTIONAL DRIP PAN ELBOW

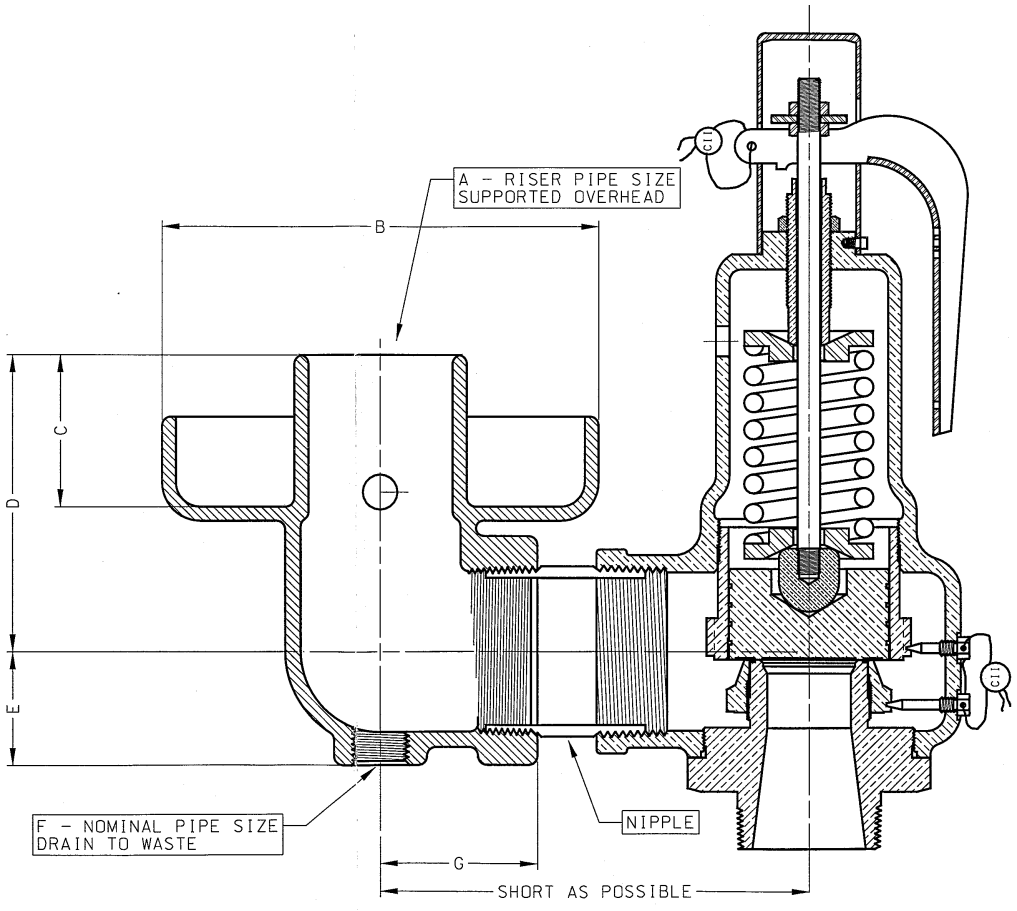
The use of a drip pan elbow is highly recommended for steam service safety valves. When attached to the valve outlet, these elbows collect and remove condensate as well as isolate the valve from discharge piping stresses.

Elbows through 4” feature female NPT threads and connect to the valve outlet using a short nipple of the appropriate pipe size. 6” and 8” elbows have integral 125# ANSI B16.1 flanges and bolt directly to the valve outlet. Select the drip pan elbow model to match the outlet size of the safety valve.

Drip Pan Dimensions

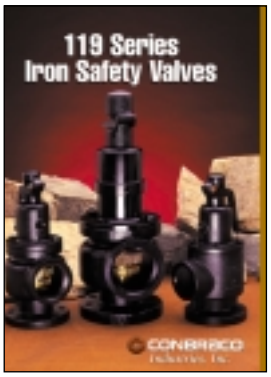
Part No.	A	B	C	D	E	F	G	Wt. LBS.
Q-5740-00	3/4	3.75	1.58	2.17	1.03	1/4	1.50	2.0
Q-5739-00	1	3.75	1.58	2.17	1.03	1/4	1.50	2.0
Q-5736-00	1-1/4	5.50	2.07	3.39	1.44	3/8	2.13	5.0
Q-5737-00	1-1/2	5.50	2.07	3.39	1.44	3/8	2.13	5.0
Q-5734-00	2	6.25	2.18	3.63	1.63	1/2	2.24	7.0

*Ordering size of Drip Pan Elbow is also nominal outlet size of Safety Valve.
*Sizes 3/4" through 2" available 3rd quarter 2000



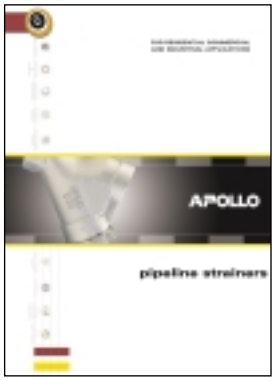
Other Conbraco Literature For Your Specification Library

500 Series Catalog



119 Series
Iron Safety Valves
Brochure

RP & C Brochure



Strainers Catalog

Plumbing and Heating
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Section IV Brochure

Section VIII
OEM Brochure

In-Line Check Valve
Brochure

To learn more about new Conbraco 19/29 Series Bronze Safety Valves, or to place an order, see your Conbraco distributor. Or contact Conbraco's customer service department. Phone (704) 841 – 6000; Fax (704) 841 – 6020.

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