TECVAL

We are Operational Reliability

820 SERIES

DIRECT ACTION REGULATING VALVE WITH PILOT LINE

TCLOUD

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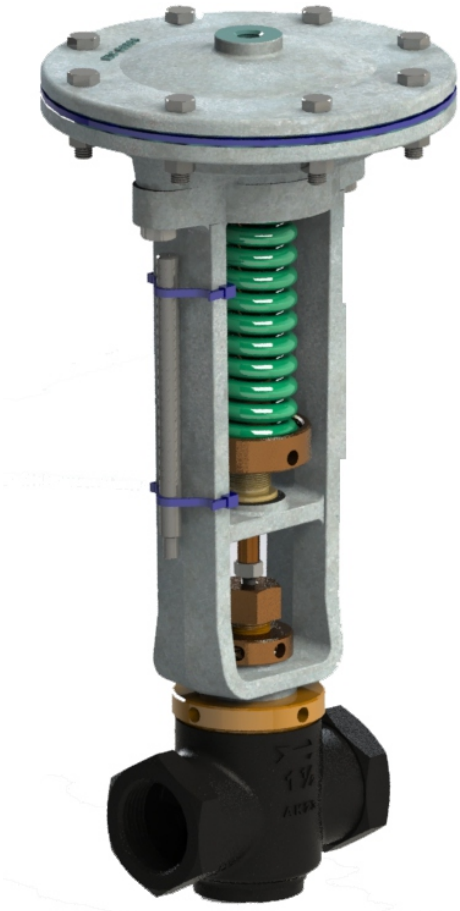
CONTENT

820 SERIES – APPLICATION

The 820 series direct acting regulating valves with pilot line are ideal for pressure control in equipment with medium capacities and variable flows.



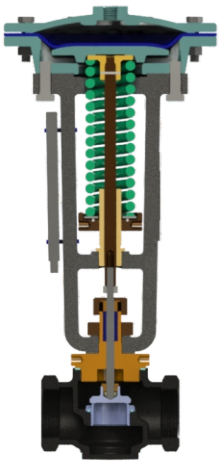
ADVANTAGES

Design and engineering

- High sensitivity guarantees excellent stability at regulated pressure.

- Excellent sealing thanks to a pivoting disc placed against the seat, which guarantees class IV sealing (FCI-70.2) or higher.

- A wide range of body and main chamber sizes offers greater sensitivity and reliable operation under moderate flow variations.

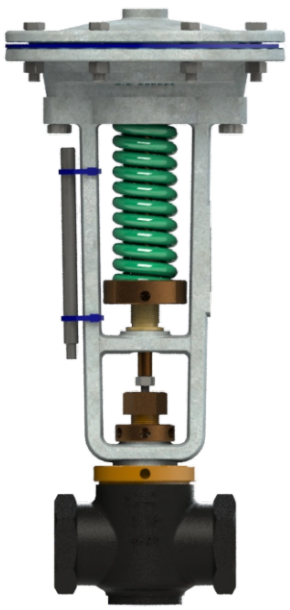


Quality

Hydrostatic and individual sealing tests and mechanical and metallographic tests ensure product quality. Test certificates are delivered with the product and registered in TECVAL's asset management system for proper traceability

Durability

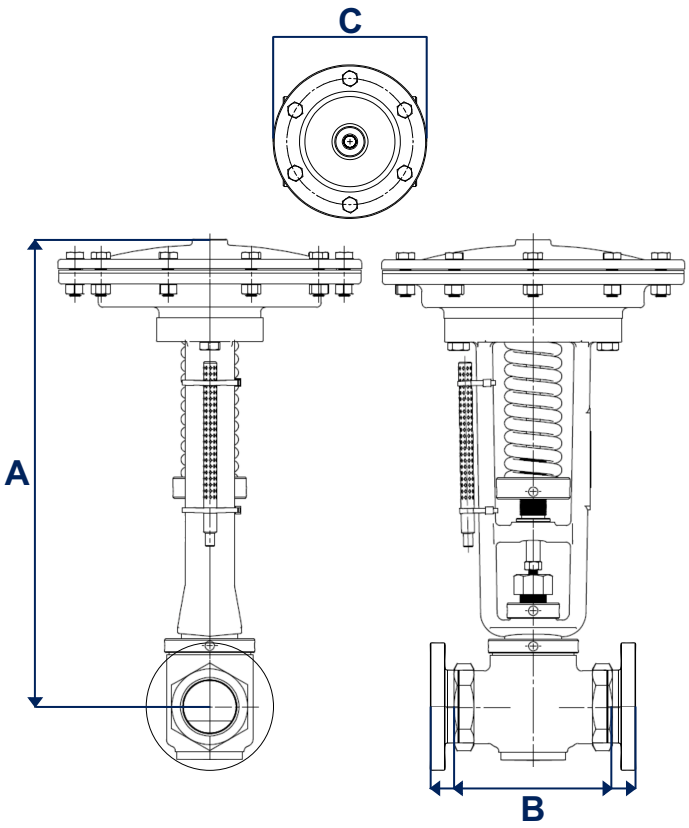
- Stainless steel disc and nozzle and a nylon-reinforced diaphragm guarantee longer valve life.



TECHNICAL DATA

General information						
Model	Size	Connection	Body material	Trim materiak	Max. Inlet pressure	Maximum temperature
821	1" - 3"	Threaded NPT	ASTM A126 Iron	AISI 304 Stainless Steel	250	308° F
822	1" - 3"	ANSI 150#	ASTM A216 Steel	AISI 304 Stainless Steel	250	350° F
823	1" - 3"	ANSI 300#	ASTM A216 Steel	AISI 304 Stainless Steel	300	420° F

DIMENSIONS

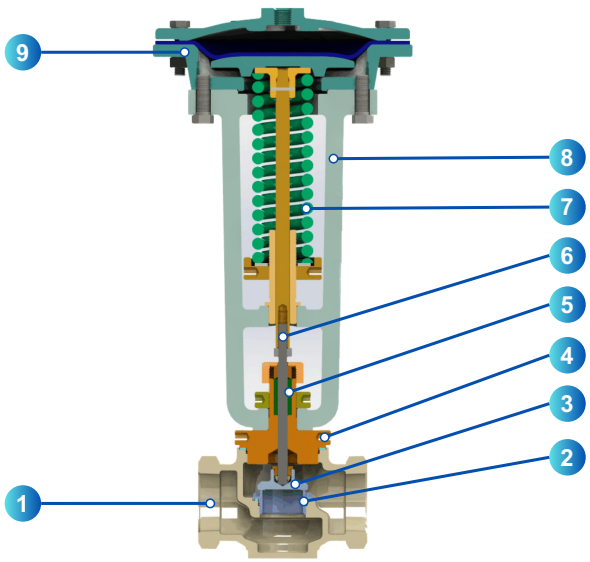


Chamber size	⌀ C
6	152
8	206
10	256
15	381

Size valve	FLANGED					THREADED				
	B	Chamber 6#	Chamber 8#	Chamber 10#	Chamber 15#	B	Chamber 6#	Chamber 8#	Chamber 10#	Chamber 15#
		A	A	A	A		A	A	A	A
½"	132	±3mm				103,5	±3 mm			
		391	--	--	--		390	390	390	400
¾"	132	±3mm				103,5	±3 mm			
		391	--	--	--		390	390	390	400
1"	-	±3mm				113	±3 mm			
		391	--	--	--		390	390	390	400
1¼"	166	±3mm				116	±3 mm			
		--	388	--	--		394	394	394	400
1½"	169	±3mm				134	±3 mm			
		--	--	--	--		400	400	400	400
2"	196	±3mm				156	±3 mm			
		400	--	--	--		400	400	400	407
2½"	206	±3mm				185	±3 mm			
		--	--	--	--		405	405	405	415
2½"	272	±3mm				200	±3 mm			
		--	420	--	--		423	423	423	430

*Dimension in millimeters (mm)

CONSTRUCTION MATERIALS



Item	Q.	Description	Material
1	1	Body	Iron ASTM A126
2	1	Nozzle	AISI 304 stainless steel
3	1	Disc*	AISI 304 stainless steel
4	1	Bonnet support	Brass
5	1	Gasket	Braided graphite
6	1	Bottom stem	AISI 304 stainless steel
7	1	Spring	AISI 1070 Steel
8	1	Bonnet	ASTM A126 Class B
9	1	Chamber	ASTM A216 WCB

*Available with elastomeric seal for liquid and gas at low temperatures with airtight sealing.

OPERATING PRINCIPLE

Steam goes through the pilot line until it reaches the chamber and condenses, filling the chamber and the pilot line all the way to the siphon. In this way, **P**2 is communicated to the diaphragm.

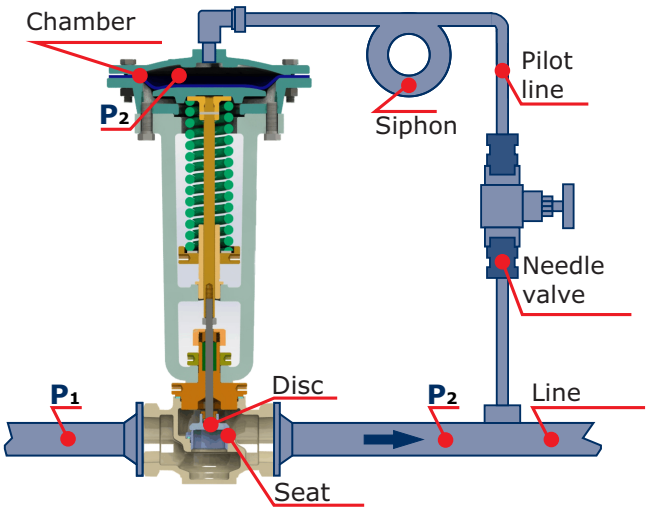
The regulation of inlet pressure **P**1 to outlet pressure **P**2 is obtained by positioning the disc on the seat in response to the demand of the device.

RESPONSE ACCORDING TO DEMAND

For zero flow: The disc lowers until it seals the seat. In this case, P2 pressure is maximum and overcomes the spring's force, compressing it to a distance equal to the lift of the valve.

For maximum flow: The spring overcomes the force exerted by the diaphragm and lifts the disc completely. In this case, the regulated pressure falls to a minimum value.

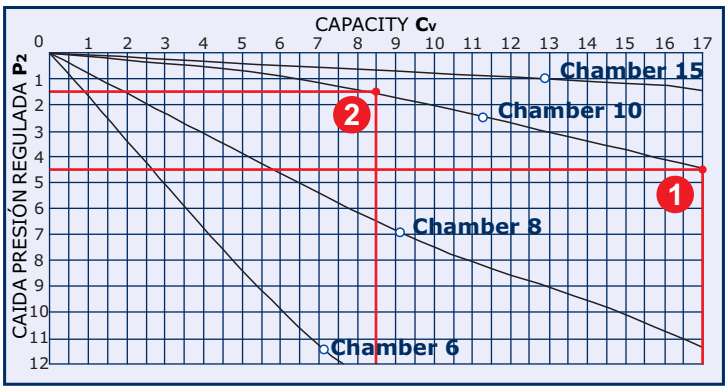
For modulating flow: The valve can be stabilized in an intermediate position in which the spring force is balanced with the force exerted by the outlet pressure on the diaphragm.



OPERATION CHART

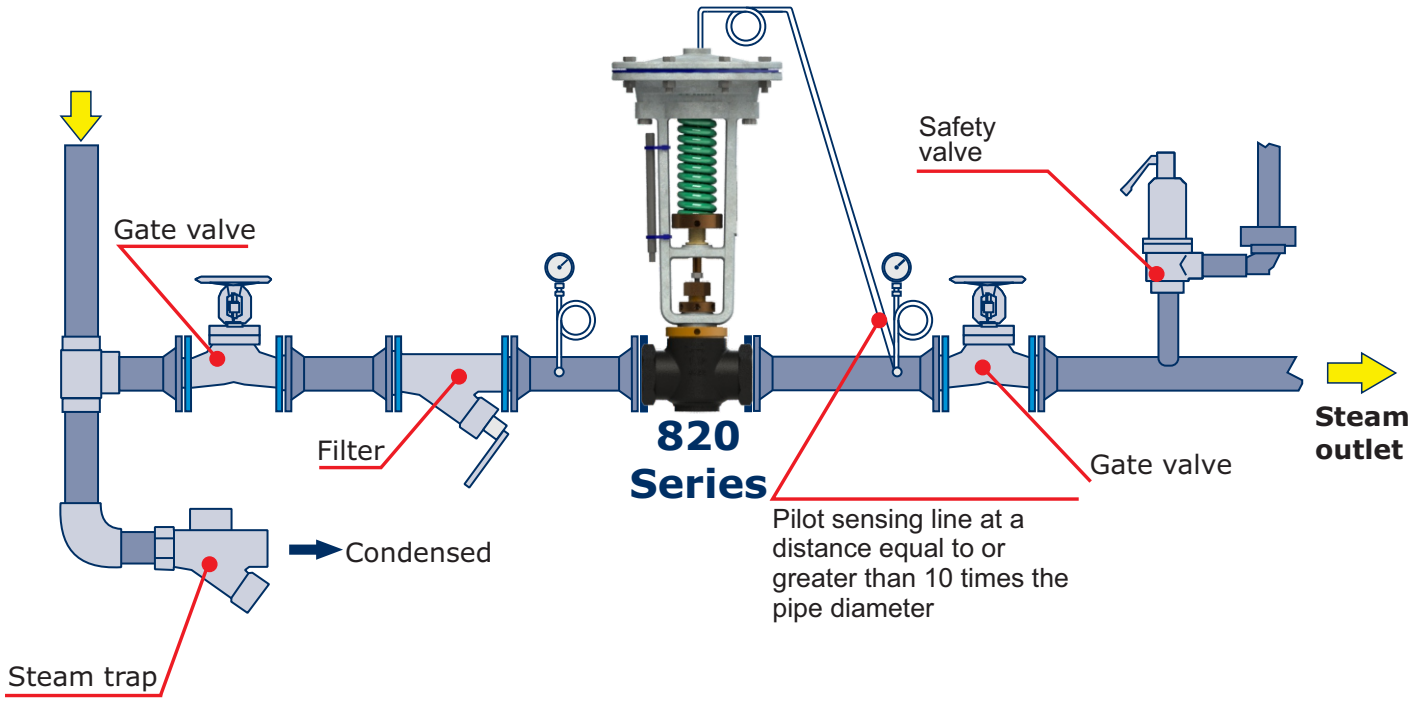
Valve capacity increases as the regulated pressure drops.

For example Point ❶ shows that for maximum capacity of an 820 1½" with a 10" chamber (green spring), the regulated pressure must drop 4.5 psi. Likewise, to achieve 50% of capacity ❷ the required pressure drop is 1.5 psi.



INSTALLATION

The installation of a TECVAL series 820 direct acting regulating valve with pilot line is described below.



SELECTION

The size of regulating valves should NOT be chosen based on line size, since it depends on the flow and pressure drop required.
The term **Cv** is used to define the capacity of any valve by establishing its water load as a reference point:

$$Cv = (Q\sqrt{GS}) / \sqrt{\Delta P}$$

Taking 1 psi as pressure drop across the valve and knowing that the specific gravity (SG) is equal to 1, the **Cv** is the amount of water in gpm that passes through the valve with a differential of 1 psi. For the 820 series, Cvs are: In this condition, the flow is throttled and pressure P2 does not affect it.

Size	½"	¾"	1"	1½"	2"	2½"	3"
Cv	1,7	4,5	10	20	25	40	50

If you want to use this value to know what the steam flow capacity will be, use the following formulas:

Critical flow
$P_2 \leq 1/2\ P_1$

In this condition, the flow is throttled and pressure **P_2** does not affect it.

$$W_{max.} = \frac{C_v\,(P_1 + 14,7)}{0,547}$$

For example: How much steam does a 1½ " valve discharge with an inlet pressure of 120 psi and 30 psi outlet pressure?

$$W_{max.} = \frac{20\ (120 + 14,7)}{0.547}$$

$$W = 4925\ Lb/H$$

Subcritical flow
$P_2 \geq 1/2\ P_1$

When **P_2** increases, the flow is reduced and vice versa: when P2 falls, the flow increases.

The "W" capacity is defined:

$$W_{max.} = 2,1\,C_v\sqrt{\Delta P(P_1 + P_2)}$$

For example: How much steam does a 1½" valve discharge with an inlet pressure of 120 psi and 100 psi outlet pressure?

Solution: $P_1 = 120 + 14,7 = 134,7$

$P_2 = 100 + 14,7 = 114,7$

$\Delta P = 20$

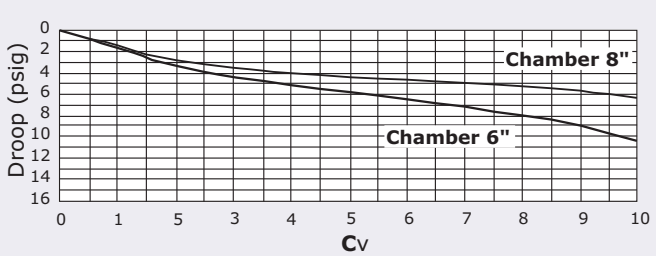
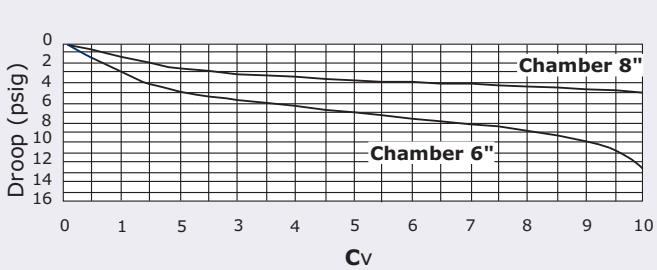
$W = 2,1 * 20\sqrt{20(134,7 + 114,7)}$

$W = 2966\ Lb/H$

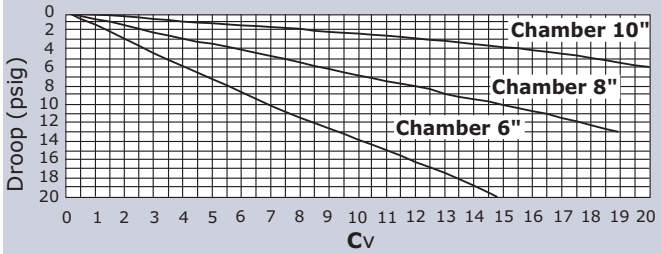
CHAMBER & SPRING SELECTION

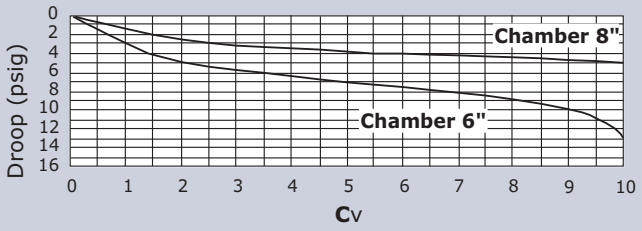
Size	Combination of spring and chamber	Maximum and minimum regulation Pressures (PSI) — Inlet pressures										Maximum outlet pressure variation
		25	50	75	100	125	150	175	200	225	250	
1/2"	V-6	14 / 25	19 / 50	20 / 75	21 / 100	22 / 104	24 / 105	24 / 106	25 / 107	26 / 108	27 / 109	±2
	N-6	3 / 25	4 / 35	5 / 36	6 / 37	7 / 38	8 / 39	9 / 40	10 / 41	11 / 42	12 / 43	±1
3/4"	V-6	13 / 25	20 / 50	22 / 75	24 / 100	26 / 108	28 / 110	30 / 112	32 / 114	34 / 115	36 / 118	±2.5
	N-6	2 / 25	4 / 36	6 / 38	8 / 40	10 / 42	12 / 44	14 / 46	16 / 48	18 / 50	20 / 52	±1
1"	N-6	13 / 25	21 / 50	24 / 75	26 / 100	29 / 108	31 / 110	34 / 113	35 / 115	39 / 117	41 / 120	±3.5
	V-8	10 / 25	14 / 50	12 / 51	13 / 52	14 / 53	15 / 54	16 / 55	17 / 56	18 / 57	19 / 58	±1.5
	N-8	3 / 17	4 / 18	5 / 19	6 / 20	7 / 21	8 / 22	9 / 23	10 / 24	11 / 25	12 / 26	±0.5
1 1/4"	N-6	13 / 25	23 / 50	26 / 75	29 / 100	32 / 112	35 / 115	38 / 118	41 / 121	44 / 124	47 / 127	±4.5
	V-8	14 / 25	15 / 50	16 / 55	17 / 56	18 / 57	19 / 58	20 / 59	21 / 50	22 / 61	23 / 62	±2.5
	N-8	44 / 24	5 / 25	6 / 26	7 / 27	8 / 28	9 / 29	10 / 30	11 / 31	12 / 32	13 / 33	±1
1 1/2"	N-6	15 / 25	24 / 50	28 / 75	31 / 100	35 / 117	38 / 120	42 / 123	45 / 127	46 / 130	52 / 134	±5.5
	N-8	11 / 25	13 / 50	15 / 52	17 / 54	19 / 56	21 / 58	23 / 60	25 / 62	27 / 64	29 / 66	±3
	V-10	7 / 25	8 / 30	9 / 31	10 / 32	11 / 33	12 / 34	13 / 35	14 / 36	15 / 37	16 / 38	±1.5
	N-10	3 / 10	4 / 11	5 / 12	6 / 13	7 / 14	8 / 15	9 / 16	10 / 17	11 / 18	12 / 19	±0.5
2"	N-6	16 / 25	25 / 50	31 / 75	36 / 100	42 / 114	47 / 120	53 / 125	58 / 133	64 / 136	69 / 142	±8
	N-8	9 / 25	12 / 50	15 / 53	18 / 56	21 / 59	24 / 62	27 / 65	30 / 68	33 / 71	36 / 74	±4
	V-10	6 / 25	7 / 30	9 / 32	10 / 33	12 / 34	13 / 36	15 / 38	16 / 39	18 / 40	19 / 42	±2
	N-10	4 / 8	5 / 10	7 / 11	8 / 13	10 / 14	11 / 16	12 / 17	14 / 19	16 / 20	17 / 22	±1
2 1/2"	N-6	11 / 25	27 / 50	35 / 75	42 / 100	50 / 117	57 / 125	65 / 132	72 / 140	80 / 147	87 / 155	±9
	N-8	11 / 25	15 / 50	19 / 54	23 / 58	27 / 82	31 / 66	35 / 70	39 / 74	43 / 78	47 / 82	±5
	V-10	7 / 25	9 / 30	12 / 32	14 / 35	17 / 37	19 / 40	22 / 42	24 / 45	27 / 47	29 / 50	±2.5
	N-15	5 / 11	6 / 12	7 / 13	8 / 14	9 / 15	10 / 16	11 / 17	12 / 17	13 / 18	13 / 19	±1
3"	N-6	18 / 25	30 / 50	40 / 75	50 / 100	60 / 120	70 / 130	80 / 140	90 / 150	100 / 160	110 / 170	±10
	N-8	12 / 25	18 / 50	24 / 56	30 / 62	36 / 68	42 / 74	48 / 80	54 / 86	60 / 92	66 / 98	±5.5
	V-10	8 / 25	10 / 32	15 / 35	18 / 39	22 / 42	25 / 46	29 / 49	32 / 53	36 / 56	39 / 60	±3
	N-15	10 / 12	7 / 13	8 / 14	9 / 15	10 / 16	12 / 18	13 / 19	14 / 20	16 / 21	17 / 23	±1.5

Select the spring and chamber combination that minimizes the shut-off pressure differential while meeting the required Cv.

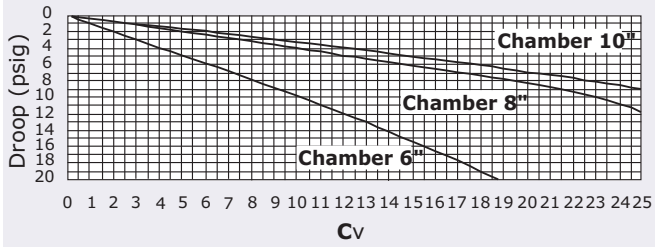
Size	Green spring	Black spring
1"		

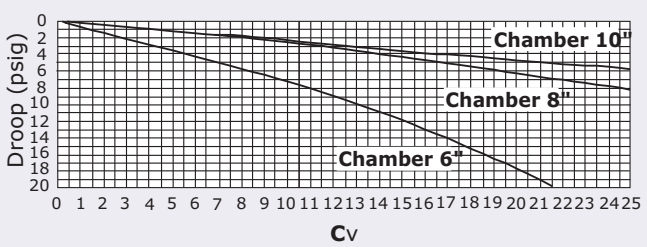
1 1/2"



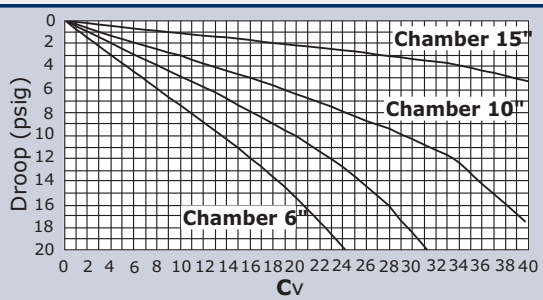


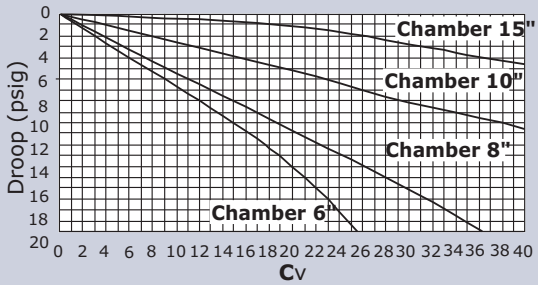
2"



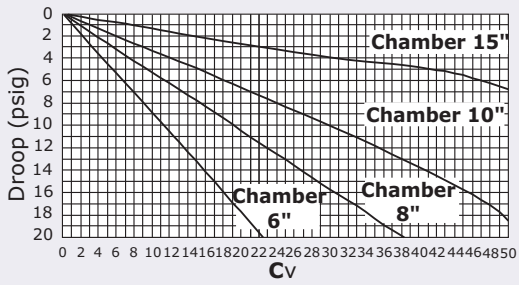


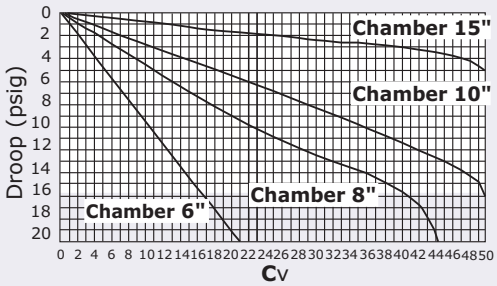
2 1/2"





3"





ORDER CODE

To identify the valve, use the following guide:

820 — CI3 — 200 — 600 — N

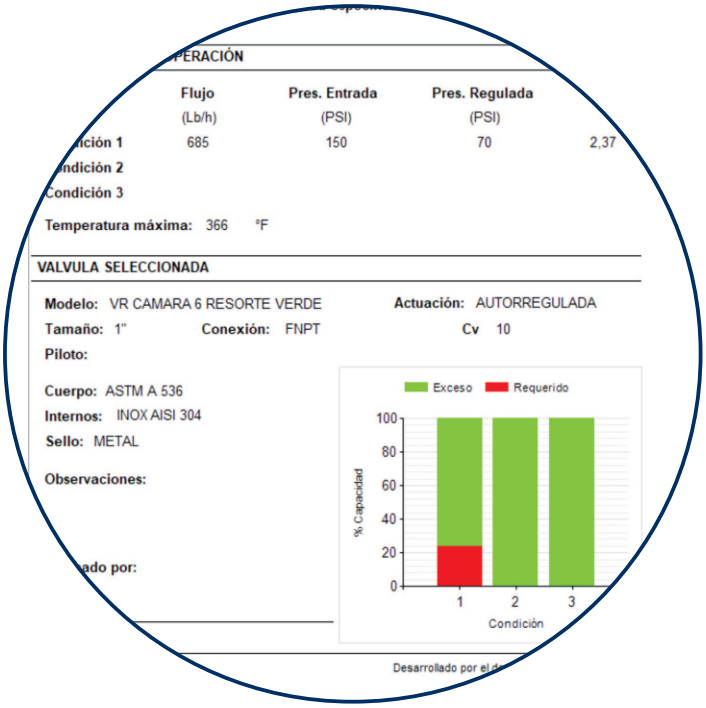
Material / Valve connection					
Class \ Tipo	125#	150#	250#	300#	FNPT
ASTM A126 Iron	CI1	-	CI3	-	CIT
ASTM A536 Ductile iron	-	DT2	-	DT4	DIT
ASTM A216 Steel	-	CS2	-	CS4	CST

Size valve	
NPS	Code
1/2"	050
3/4"	075
1"	100
1 1/2"	150
2"	200
2 1/2"	250
3"	300

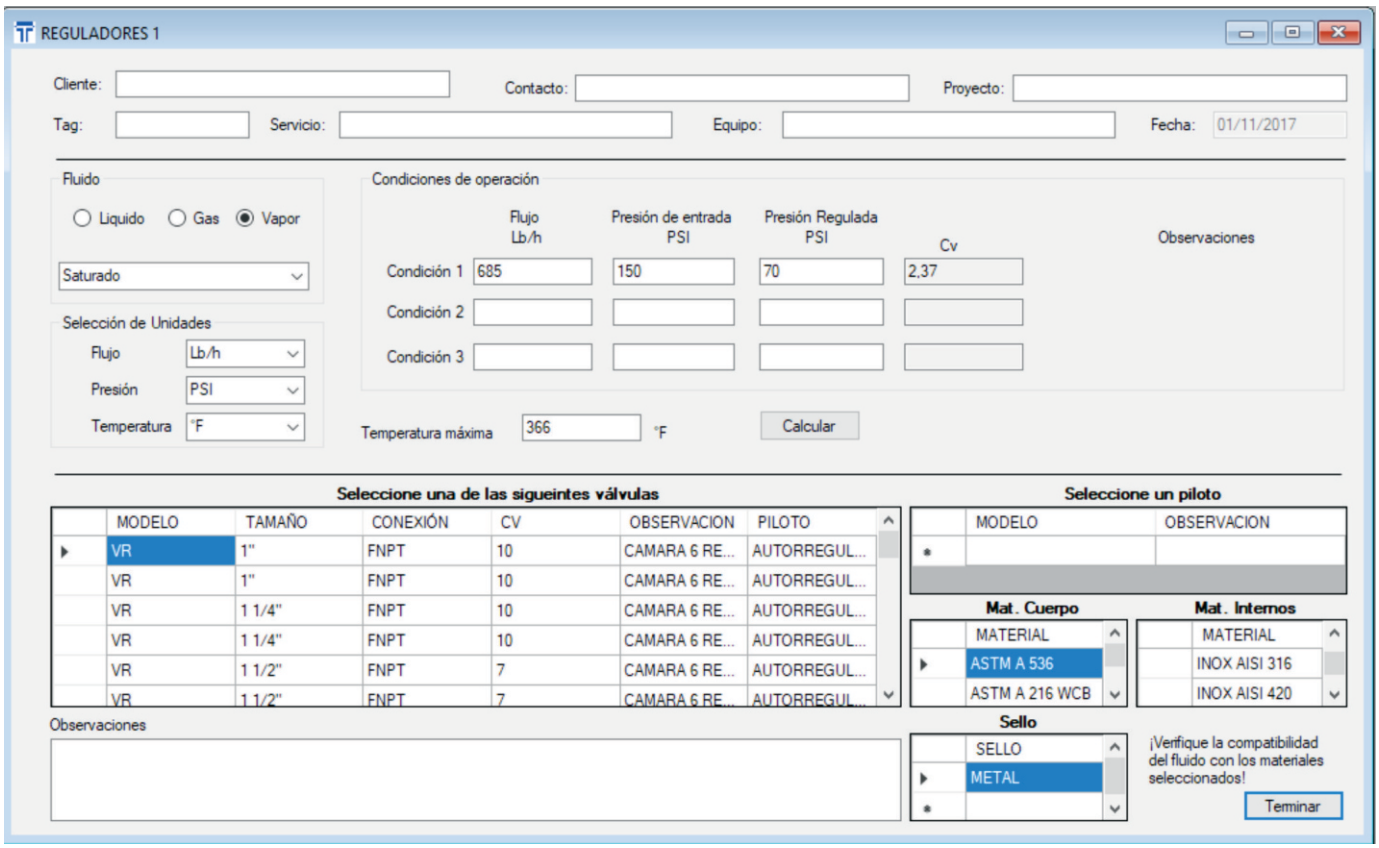
Chamber	
Size	Code
6"	600
8"	800
10"	1000
15"	1500

Spring	
Color	Code
Green	V
Black	N

SIZING SOFTWARE



TECVAL's sizing software ensures adequate selection according to pressure, temperature, flow and other process requirements.



TECVAL

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Atlantic Coast Service Center: Centro Logístico Stock Caribe - Km 1, Vía la Cordialidad - Warehouse 3B / Barranquilla