TECVAL

We are Operational Reliability

850 SERIES

PILOT OPERATED STEAM REGULATOR VALVE

TCLOUD

www.tecvalonline.com

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PILOT OPERATED STEAM REGULATOR VALVE

CONTENT

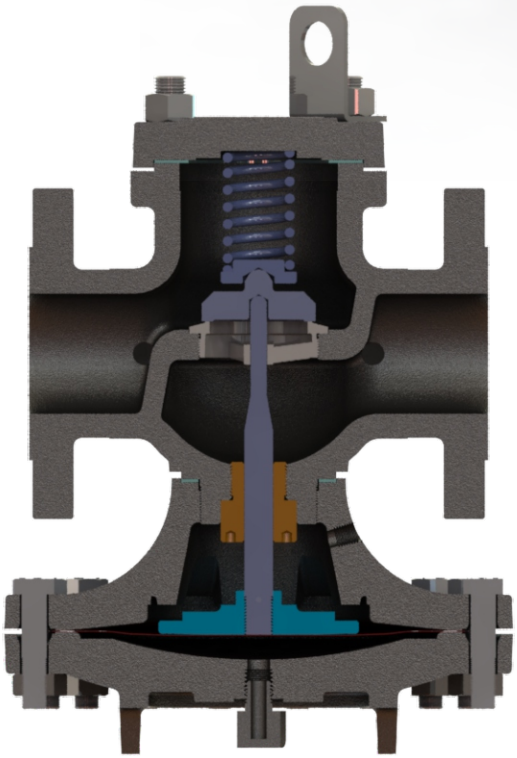
850 SERIES – APPLICATION

Our pilot operated steam regulator valve line is used in processes with higher flow requirements where greater accuracy is necessary.

ADVANTAGES

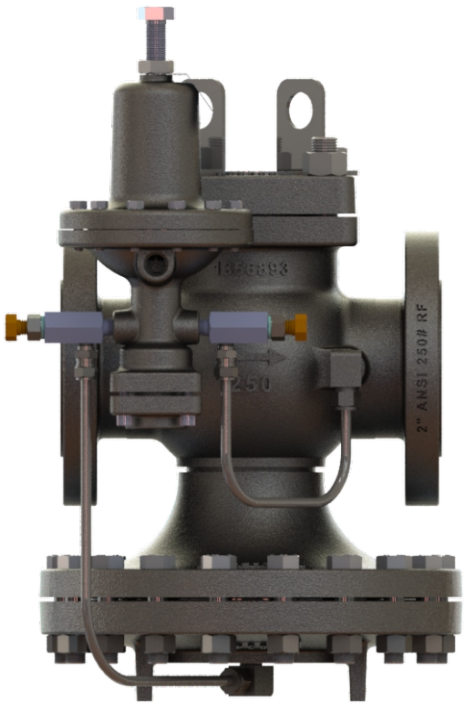
Design and engineering

- Greater flow capacity when compared to similar designs.



Durability

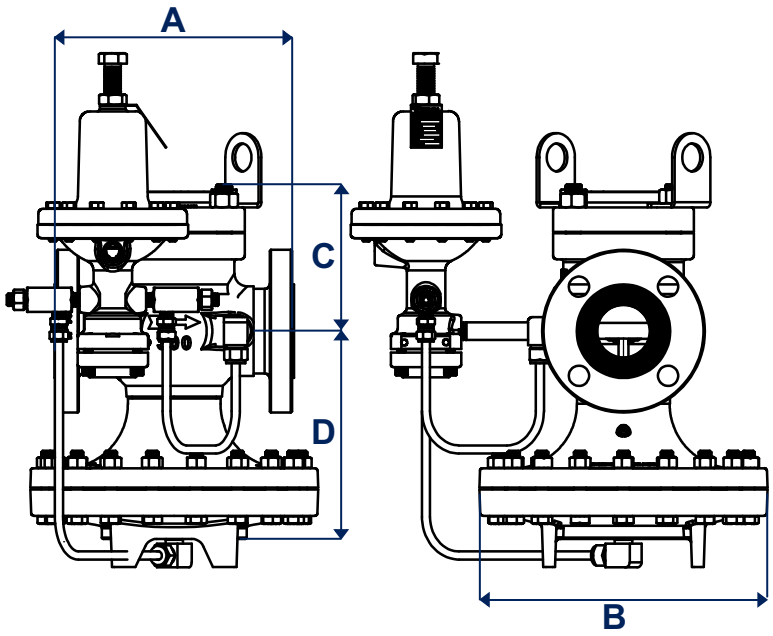
- Hardened stainless steel nozzle; cobalt chromium coating ensures longer useful life.
- Pivoting disc for better sealing.



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.

DIMENSIONS

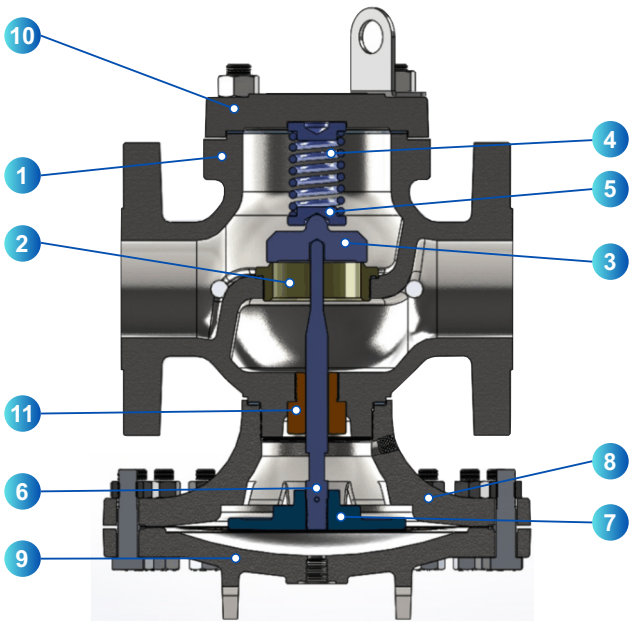


Size valve	Connection	Dimensions				Weight
		A	B	C	D	
½"	NPT	4.4	5.8	3.5	6.1	9.1
1	NPT	5.4	7	4.5	6.6	13.2
1½"	NPT	7.4	8.7	4.3	7.1	28.6
	ANSI 150	7.4				33
2"	NPT	7.6	9.8	5.2	7.6	38
	ANSI 150	9				43.6
2½"	ANSI 150	10	10.8	5.7	8.3	53.9
3"	ANSI 150	10.8	11.7	6.6	9.2	76

*Dimension in millimeters (mm)
and weight in kilograms (kg)

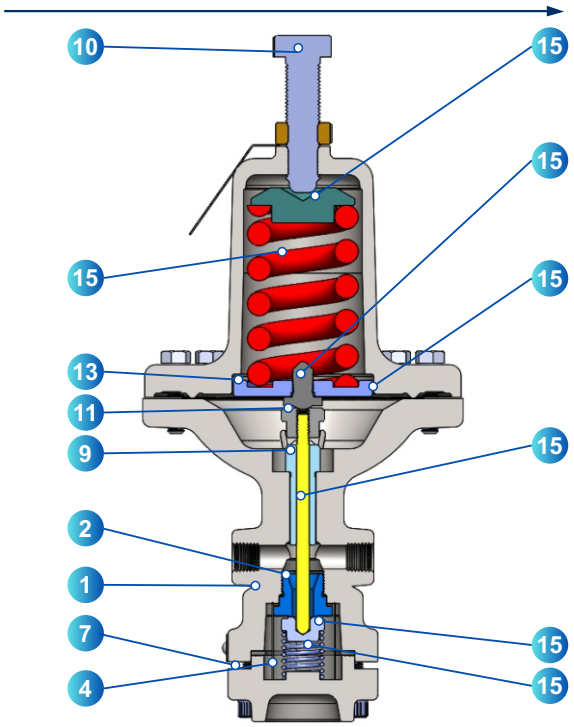
CONSTRUCTION MATERIALS

Main valve



Item	Q.	Description	Material
1	1	Body	ASTM A536 (ductile/nodular iron)
2	1	Nozzle	Stainless steel Cobalt chromium coating
3	1	Disc	AISI 420 hardened stainless steel
4	1	Spring	AISI 302 stainless steel
5	1	Pivot sheave	AISI 304 stainless steel
6	1	Stem	AISI 304 stainless steel
7	1	Diaphragm	Phosphor bronze
8	1	Chamber	ASTM A536 (ductile/nodular iron)
9	1	Chamber cover	ASTM A536 (ductile / nodular iron)
10	1	Body cover	ASTM A536 (ductile / nodular iron)
11	1	Stem guide bushing	Phosphor bronze

Pilot



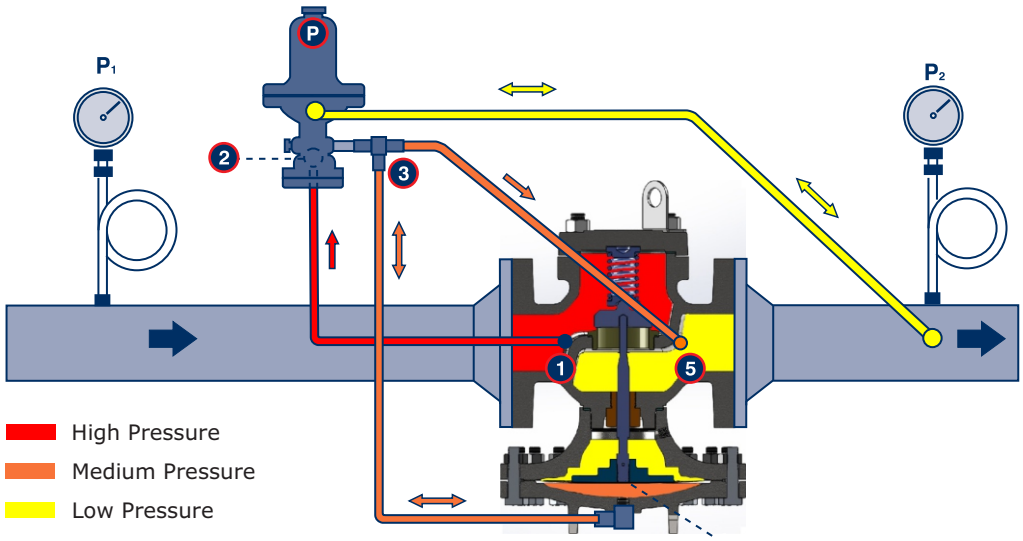
Item	Q.	Description	Material
1	1	Body	Ductile iron ASTM A536
2	1	Nozzle	AISI 420 stainless steel
3	1	Disc	AISI 304 stainless steel
4	1	Lower Filter	AISI 304 stainless steel
5	1	Lower spring	AISI 302 stainless steel
6	1	Upper shave	AISI 304 stainless steel
7	1	Lower cover	Ductile iron ASTM A-536
8	1	Stem	AISI 304 stainless steel
9	1	Stem guide	AISI 304 stainless steel
10	1	Compression screw	AISI 304 stainless steel
11	1	Pivot nut	AISI 304 stainless steel
12	1	Diaphragm	Phosphor bronze
13	1	Diaphragm adjustment plate	AISI 304 stainless steel
14	1	Pivot screw	Phosphor bronze
15	1	Upper spring	AISI 302 stainless steel

OPERATING PRINCIPLE

The 850 TECVAL series valve is normally closed. Inlet pressure - **P**1 is regulated to a controlled outlet pressure - **P**2 by adjusting the compression screw in the pilot valve. The pressure in the valve chamber is controlled by the throttling action of the pilot valve resulting from changes in outlet pressure sensed through the line indicated in yellow.

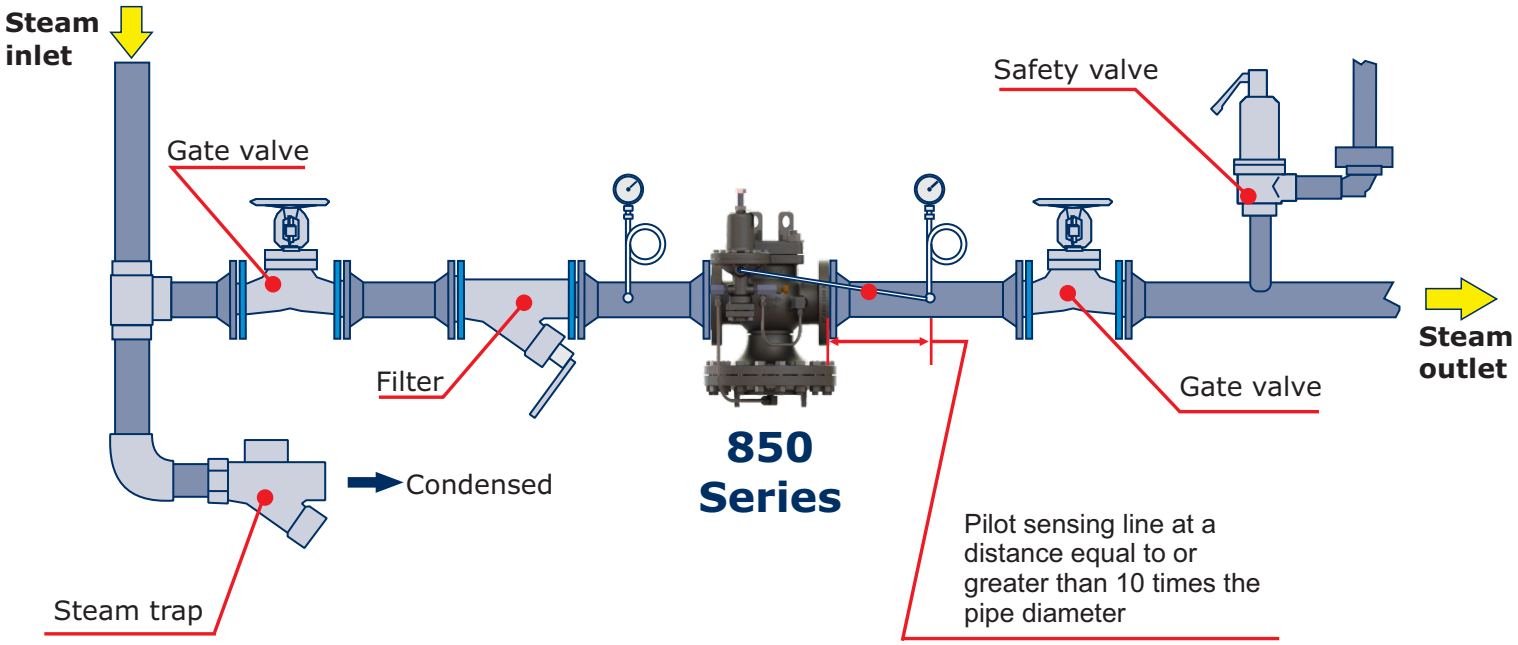
The throttling action of the pilot valve acts as a pressure signal amplifier so that a small variation in the outlet pressure - **P**2 is translated into an amplified signal in the diaphragm chamber ❹, repositioning the disc until the outlet pressure - P2 returns to its set value.

Steam flows upstream from point ❶ through the inlet line indicated in red until it reaches the inlet of the pilot valve at point ❷ . The throttling action of the pilot valve reduces the pressure and removes steam at point ❸, where it is separated into two flows: the first feeds the diaphragm chamber (point ❹) and the second returns through the line control up to point ❺.



INSTALLATION

The installation of a TECVAL 850 series pilot steam regulating valve is described below.



ORDER CODE

To identify the valve, use the following guide:

850 — 250 — F125 — PP — Y

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

Connection	
Class	Code
NPT	NPT
125#	F125
150#	F150
250#	F250
300#	F300

Pilots	
Type	Code
Piloto de Presión	PP

Resorte	
Rangos de Presión (psig)	Código
3-20	Y
5-50	R
10-100	B
20-150	S

SELECTION

For regulator selection: ❶ find the inlet pressure in the first column of table 4 and select the row with the closest outlet pressure range, ❷ in the selected row, locate the capacity value that exceeds the required capacity, ❸ move vertically upward and locate the corresponding regulator size. ❹ To select the spring, make sure that pressure is within the spring pressure range.

For example: To select the regulator and spring size for an application with 100 psig inlet, 15 psig regulated pressure and a required capacity of 7000 lb/hr, follow the red line indicated in tables 4 and 5. The 2½" regulator is the first valve to exceed the required capacity at an inlet pressure of 100 psig and an outlet pressure range of 0-50 psig. The yellow spring is to be selected since the regulated pressure of 15 psig is within the spring pressure range (3-20 psig).

Table 4

Steam pressure (psig)		Saturated Steam Capacity per Valve Size (lb/hr)				
Inlet	Outlet	11/2"	2"	21/2"	3"	4"
C_v Value		19,8	31	44	74	109
20	5-0	1175	1839	2611	4391	6468
25	10	1292	2023	2872	4830	7114
	5-0	1344	2104	2987	5024	7400
30	15	1389	2175	3087	5191	7647
	10-0	1513	2370	3363	5656	8332
40	25	1565	2450	3477	5848	8613
	20	1758	2753	3907	6571	9679
	15-0	1852	2900	4116	6922	10196
50	35	1722	2697	3828	6437	9482
	30	1945	3045	4322	7269	10707
	25	2124	3326	4721	7939	11694
	20-0	2191	3430	4868	8187	12059
60	45	1867	2923	4149	6977	10278
	40	2115	3312	4701	7906	11645
	35	2319	3630	5153	8666	12765
	30-0	2529	3960	5620	9453	13923
75	55	2348	3676	5217	8774	12924
	50	2583	4045	5741	9655	14221
	45	2784	4358	6186	10404	15324
	40-0	3037	4755	6749	11351	16719
❶ 100	75	2972	4654	6605	11109	16363
	60	3619	5666	❷ 8043	13526	19924
	❷ 50-0	3884	6080	8630	14514	21379
125	100	3316	5192	7369	12393	18255
	75	4453	6972	9896	16643	24515
	65-0	4730	7405	10511	17678	26039
150	125	3627	5679	8061	13556	19968
	100	4915	7694	10921	18367	27055
	80-0	5576	8731	12392	20841	30698
175	150	3914	6128	8697	14627	21546
	125	5336	8355	11858	19943	29376
	100	6283	9836	13961	23480	34586
	95-0	6423	10056	14273	24005	35358
200	150	5727	8966	12726	21403	31527
	125	6779	10613	15064	25335	37318
	110-0	7269	11381	16154	27168	40018
225	175	6093	9539	13539	22770	33540
	150	7241	11337	16092	27064	39864
	125-0	8116	12706	180 5	30332	44678
250	200	6438	10079	14306	24059	35439
	175	7676	12018	17058	28688	42257
	150	8616	13490	19147	32202	47433
	140-0	8962	14032	19916	33495	49337

Table 5

Spring color	Pressure Range psig
❹ Yellow	3-20
Red	5-50
Black	10-100
Silver	20-150

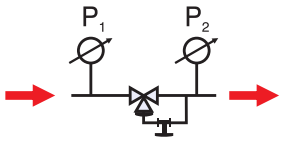
For other pressures

For inlet or outlet pressures other than those indicated in table 4, when selecting the regulator make sure that its Cv meets the following criteria:

C_v Required x 2 ⩾ C_v of the regulator ⩾ C_v necessary x 1.2

To calculate the required Cv value, use the following formulas:

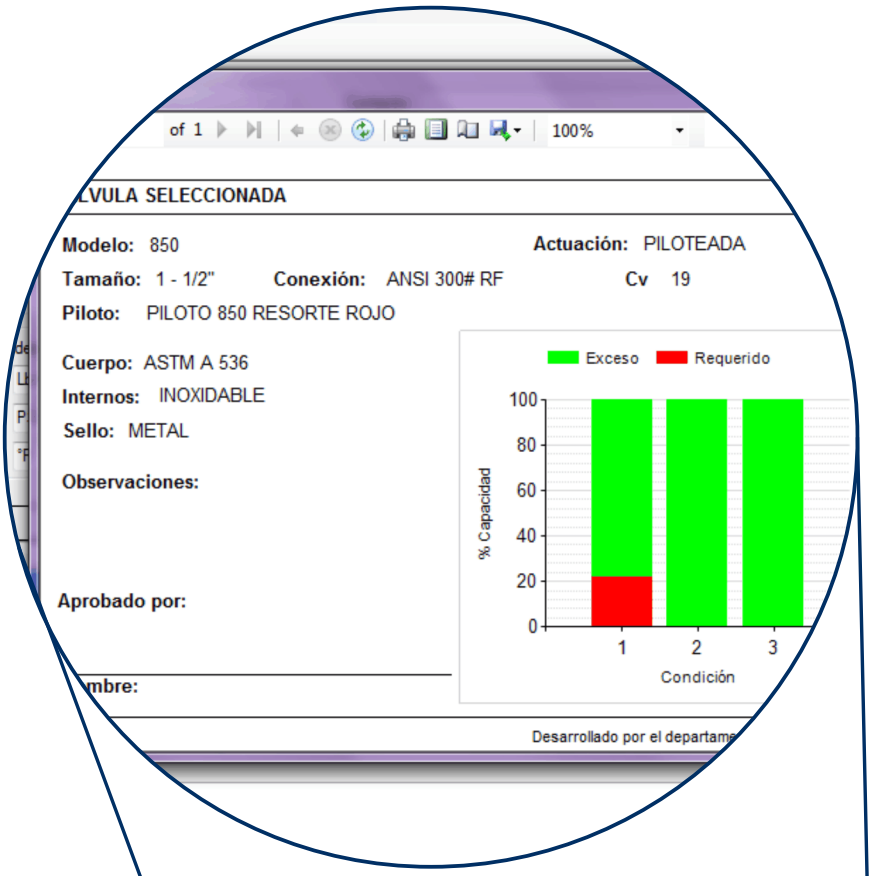
Subcritical flow $P_2 > .58\ P_1$	Critical flow $P_2 \leq .58\ P_1$
Saturated steam	
$C_v = \frac{W}{2.1\sqrt{\Delta P(P_1 + P_2)}}$	$C_v = \frac{W}{1.71P_1}$
Superheated steam	
$C_v = \frac{W(1+.0007T_{SH})}{2.1\sqrt{\Delta P(P_1 + P_2)}}$	$C_v = \frac{W(1+.0007T_{SH})}{1.75P_1}$

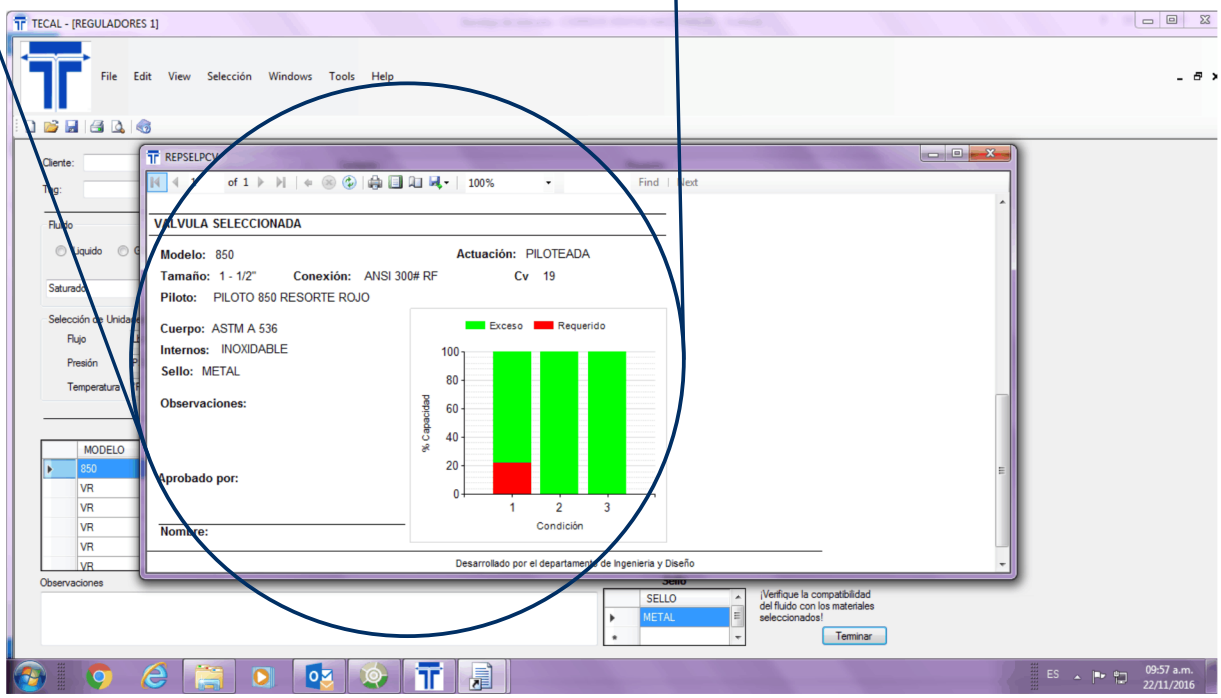


Conventions

ΔP = Pressure drop (P_1 - P_2)
P_1 = Inlet pressure (psia)
P_2 = Outlet pressure (psia)
T_{SH} = Temperature (°F)
W = Steam flow (lbs/hr)

SIZING SOFTWARE





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

TECVAL

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