Specification Data CY3100
5/92

Pressure Reducing Valve
Model 31

Steam Service

Masoneilan DRESSER

Table of Contents

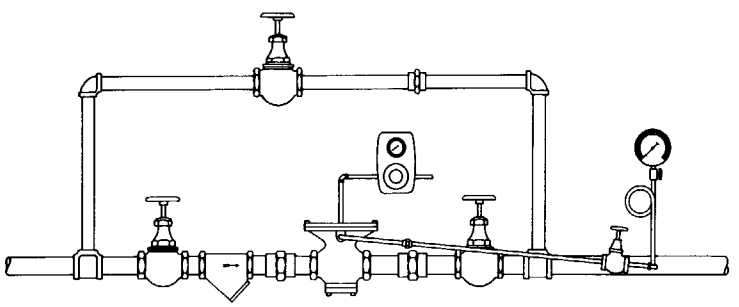
Foreword

The Model 31 is a simple air loaded diaphragm operated steam reducing valve for use where:

1. It is desirable to control reduced pressure from a remote point; or
2. Steam condition and/or pressure drop requirements make a pilot type regulator impractical.

It is recommended for heating, process supply and makeup systems for general plant use.

An external air supply and loading regulator with relief capability are required for valve operation as indicated in the following illustration.

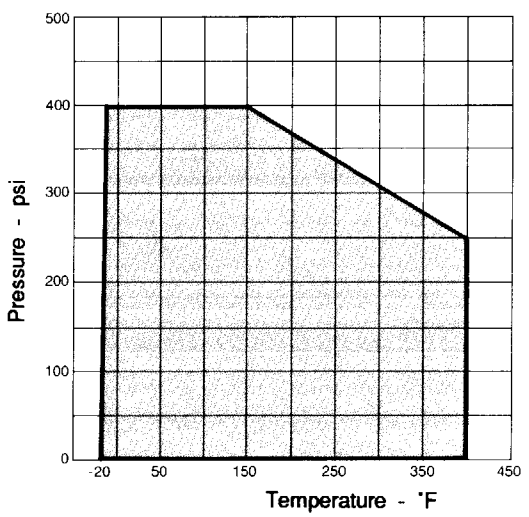


Valve Specifications

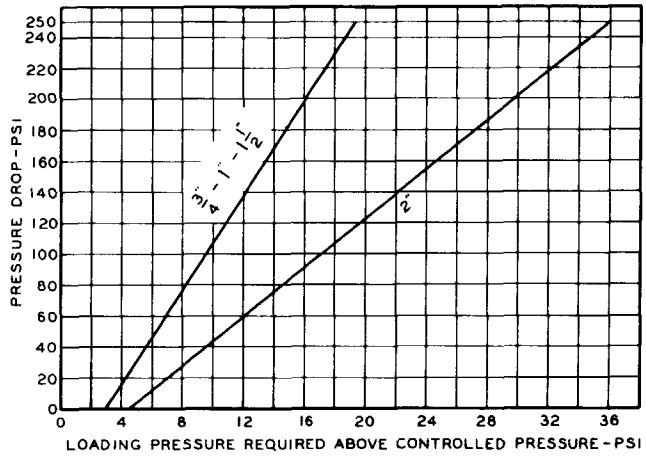
Sizes (in.)		3/4	1	1 1/2	2
Flow Coefficient - C_v		5.7	9.5	24	38
End Connections	Threaded NPT	•	•	•	•
	Flanged - 250 lb				•
Body Material		Cast Iron			
Diaphragm Material		302 Stainless Steel			
Trim	Plug	416 Stainless Steel			
	Seat Ring	316 Stainless Steel			
Critical Flow Factor		F_L = 0.9			

Pressure/Temperature Limits

The operating pressure and temperature must be within the shaded area of the graph.



Loading Pressure



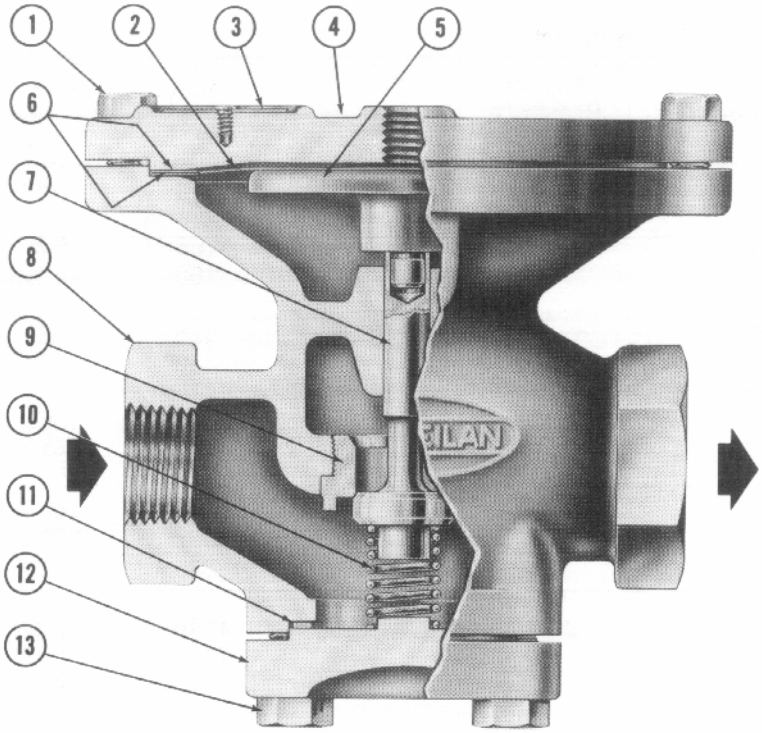
It is necessary that the upper diaphragm chamber be supplied with a loading pressure sufficient to overcome the forces tending to close the valve. These forces are the valve spring, pressure drop across the valve, plus the reduced pressure working on the underside of the diaphragm. The amount of loading pressure required, in excess of the desired controlled pressure, can be determined from the chart.

For example:

Valve Size	2"
Inlet Pressure	100 psi
Outlet Pressure	40 psi
Pressure Drop	60 psi

From the chart, a 2" valve with a pressure drop of 60 psi requires a loading pressure of 12 psi above controlled pressure. Therefore, to hold a constant downstream pressure of 40 psi, a loading pressure of 52 psi is required.

Materials



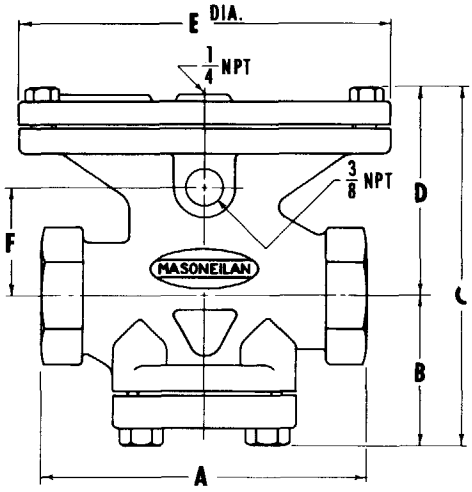
Ref. No.	Part Number	Material
1	Cap Screw	Carbon Steel
2	Diaphragm	302 Stainless Steel
3	Identification Plate	Aluminum
4	Diaphragm Case	Cast Iron ASTM A126 Cl B
5	Diaphragm Plate	Cast Iron ASTM A126 Cl B
6	Diaphragm Gasket	Nitrile Bound Acrylic
7	Plug	416 Stainless Steel
8	Body	Cast Iron ASTM A126 Cl B
9	Seat Ring	316 Stainless Steel
10	Spring	Nickel-Chromium-Iron Alloy
11	Blindhead Gasket	Nitrile Bound Acrylic
12	Blindhead	Cast Iron ASTM A126 Cl B
13	Cap Screws	Carbon Steel

Valve Capacity

Saturated Steam (lb/hr)

Inlet Pressure psig	Outlet Pressure psig	Valve Size (in.)			
		3/4	1	1 1/2	2
5	2	90	145	364	580
10	2	154	255	645	1025
	8	100	165	420	660
20	2	255	425	1080	1700
	10	260	430	1100	1400
30	2-10	465	795	1950	3050
	20	330	560	1410	2230
50	2-20	685	1100	2800	4650
	25	600	1000	2500	4200
	35	490	820	2070	3280
60	2-25	790	1340	3300	5350
	35	660	1100	2800	4400
	50	440	740	1870	2970
75	2-30	950	1600	3900	6350
	50	760	1300	3100	5000
	65	490	810	2060	3270
100	2-50	1200	2000	5000	8050
	60	1030	1750	4350	7000
	75	850	1500	3600	5800
125	2-60	1450	2450	6100	9750
	80	1200	2100	5200	8300
	100	960	1600	4100	6500
150	2-70	1750	2900	7300	12000
	100	1400	2400	5800	9600
	125	1050	1700	4450	6900
175	2-90	2000	3400	8300	13500
	100	1800	3100	7600	12500
	125	1500	2600	6500	10500
	150	1150	1900	4700	7700
200	2-100	2300	3900	9800	15500
	125	1900	3200	7800	13000
	150	1700	2750	6900	11000
225	2-120	2700	4400	11000	17000
	150	2200	3600	8800	14000
250	2-130	2800	4600	11500	18500
	150	2500	4250	10500	16500

Dimensions and Weights (in. and lb.)



Valve Size (in.)	A		B	C	D	E	F	Weight
	Threaded	Flanged						
3/4	5	N/A	2 1/4	6 1/4	3 13/14	5 3/4	1 15/16	15
1	6	N/A	2 13/16	6 3/4	3 15/16	6 7/8	1 1/16	22
1 1/2	7	N/A	3 15/16	9 1/8	5 3/16	9 1/8	3 1/4	40
2	9 1/4	10 1/2	4 7/8	10 3/8	5 1/2	10 1/8	3 3/8	70

Part Numbers

Size (in.)	Part Numbers	
	Threaded Ends	250 lb. Flanged Ends
3/4	805031-000-000	N/A
1	806031-000-000	
1 1/2	808031-000-000	
2	809031-000-000	824031-000-000

USEFUL EQUIVALENTS

U.S. CUSTOMARY UNITS

Specific gravity of air G = 1 (reference for gases)

U.S. gallon of water = 8.33 lbs @ std. cond.
1 cubic foot of water = 7.48 gallons
Air specific volume = 1/density = 13.1 cubic feet/lb
G of any gas = density of gas/0.076

Specific gravity of water = 1 (reference for liquids)

1 cubic foot of water = 62.34 lbs @ std. cond. (= density)
1 cubic foot of air = 0.076 lbs @ std. cond. (= air density)
Air molecular weight M = 29
G of any gas = molecular wt. of gas/29

$$\text{G of gas at flowing temp.} = \frac{G \times 520}{T + 460}$$

Standard conditions (U.S. customary) are at 14.69 psia & 60°F

Flow conversion of gas

$$SCFH = \frac{\text{Lbs/hr}}{\text{density}} \qquad SCFH = \frac{\text{Lbs/hr} \times 379}{M} \qquad SCFH = \frac{\text{Lbs/hr} \times 13.1}{G}$$

Flow conversion of liquid

$$GPM = \frac{\text{Lbs/hr}}{500 \times G}$$

Temperature Conversion

F (Fahrenheit) = C(9/5) + 32 **C (Celsius) = (F - 32) 5/9**

METRIC CONVERSION TABLES

Multiply	By	To Obtain
LENGTH		
millimeters	0.039	inches
centimeters	0.394	inches
inches	2.54	centimeters
feet	30.48	centimeters
feet	0.304	meters
AREA		
sq. centimeters	0.155	sq. inches
sq. centimeters	0.001076	sq. feet
sq. inches	6.452	sq. centimeters
sq. inches	0.00694	sq. feet
sq. feet	929	sq. centimeters
FLOW RATES		
gallons US/minute (GPM)	3.785	liters/min
gallons US/minute	0.133	ft^3/min
gallons US/minute	0.227	m^3/hr
cubic feet/minute	7.481	GPM
cubic feet/hour	0.1247	GPM
cubic feet/hour	0.01667	ft^3/min
cubic meters/hour	4.403	GPM
cubic meters/hour	35.31	ft^3/hr
VELOCITY		
feet per second	0.3048	meters/second
feet per second	1.097	km/hr
feet per second	0.6818	miles/hr

Multiply	By	To Obtain
VOLUME & CAPACITY		
cubic feet	28.32	liters
cubic feet	7.4805	gallons
liters	61.02	cubic inches
liters	0.03531	cubic feet
liters	0.264	gallons
gallons	3785.0	cubic cm
gallons	231.0	cubic inches
gallons	0.1337	cubic feet
WEIGHT		
pounds	0.453	kilogram
kilogram	2.205	pounds
PRESSURE & HEAD		
pounds/sq. inch	0.06895	bar
pounds/sq. inch	0.06804	atmosphere
pounds/sq. inch	0.0703	Kg/cm^2
pounds/sq. inch	2.307	ft of H_20 (4°C)
pounds/sq. inch	0.703	m of H_20 (4°C)
pounds/sq. inch	5.171	cm of Hg (0°C)
pounds/sq. inch	2.036	in of Hg (0°C)
atmosphere	14.69	psi
atmosphere	1.013	bar
atmosphere	1.033	Kg/cm^2
atmosphere	101.3	kPa
bar	14.50	psi
kilogram/sq. cm	14.22	psi
kiloPascal	0.145	psi

Facilities: **Brazil, Canada, France, Germany, Italy, Japan, Mexico, Netherlands, Singapore, Spain, United Kingdom, United States**

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