

# Line Pressure Regulators

## Type 90 2-PSI / 5-PSI inlet



### Technical Specifications

- Rated inlet pressure:** 2 PSI / 5 PSI
- Outlet pressure setting:**
  - 5"-9" w.c.
  - 7"-9" w.c.
  - 7"-11 "w.c.
  - 9"-12" w.c.
  - 11"- 13" w.c.
- Gases:** Natural Gas or Propane
- Code:** The four digit code indicates the year and the calendar week, in which the regulator was manufactured (i.e. 1012: in twelfth week of 2010)
- Ambient temp. range:** -40/205°F (-40/96°C)
- Pipe size NPT:** 1/2" x 1/2"
- Venting:** Vent limiter "0" 3-18 1/8" NPT
- Emergency exposure limits:** 65 PSIG (4.5 BAR) inlet side only
- Type 90:** L 4.409 x W 3.956 x H 3.492" - Weight: 22.75 oz.

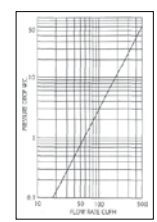
### Applications

Type 90 OARA regulators are manufactured to supply the demands of both Line Pressure Regulators and Gas Appliance Regulators.

### Features

- Precise regulating control of both full flow and of tiny pilot flows.
- All models are approved by IAS, in accordance with the two different standards.
- Manufactured in order to fulfil utility specifications for usage in residential, commercial and industrial applications.
- Materials of all component parts are carefully selected and corrosion-resistant.
- Diaphragm and washer are made of NITRILE RUBBER, which guarantees resistance to combustible gases.
- Rubber is selected to work at the following ambient temperatures: -40/205 °F (-40/96°).
- Housings are made of rugged die-cast aluminium.
- Regulators are supplied with a vent limiter type "0" 3-18 thread 1/8" NPT. In case of diaphragm rupture, gas leakage is limited within ANSI standard levels.
- Manufacturing of the regulators in terms of balancing capacity guarantees excellent control of the outlet pressure in case of absence of flow.

### PRESSURE DROP CHART



**CAPACITIES based on 1" w.c. pressure drop from set point 0.64 sp gr gas expressed in BTU (PROPANE stabilizer)**

Model	Outlet Pressure	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar	2 PSIG= 138 mbar	5 PSIG= 345 mbar
90	6" w.c.	250,000	313,000	368,000	447,000	548,000
	7" w.c.	243,000	313,000	360,000	439,000	541,000
	8" w.c.	243,000	306,000	360,000	423,000	525,000
	9" w.c.	227,000	298,000	337,000	407,000	509,000
	10" w.c.	211,000	282,000	321,000	384,000	486,000
	11" w.c.	196,000	266,000	306,000	368,000	470,000
	12" w.c.	196,000	259,000	306,000	360,000	462,000

**PRESSURE DROP - 0.64 sp gr gas expressed in CFH (m³/h)**

Press. drop	7.0" PSIG= 17 mbar	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar
<b>Flow rate CFH (m³/h)</b>	155 (4.3)	220 (6.1)	280 (7.8)	310 (8.7)

**CAPACITIES based on 1" w.c. pressure drop from set point 0.64 sp gr gas expressed in CFH (m³/h)**

Model	Outlet Pressure	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar	2 PSIG= 138 mbar	5 PSIG= 345 mbar
90	6" w.c.	160 (4.5)	200 (5.6)	235 (6.6)	285 (8.0)	350 (9.8)
	7" w.c.	155 (4.3)	200 (5.6)	230 (6.4)	280 (7.8)	345 (9.7)
	8" w.c.	155 (4.3)	195 (5.5)	230 (6.4)	270 (7.6)	335 (9.4)
	9" w.c.	145 (4.1)	190 (5.3)	215 (6.0)	260 (7.3)	325 (9.1)
	10" w.c.	135 (3.8)	180 (5.0)	205 (5.7)	245 (6.7)	310 (8.7)
	11" w.c.	125 (3.5)	170 (4.8)	195 (5.5)	235 (6.6)	300 (8.4)
	12" w.c.	125 (3.5)	165 (5.5)	195 (5.5)	230 (6.4)	295 (8.3)

# Line Pressure Regulators

Line Pressure Regulators

## Type 95 2-PSI / 5-PSI inlet



### Technical Specifications

- Rated inlet pressure:** 2 PSI / 5 PSI
- Outlet pressure setting:**  
7"-11" w.c.  
11"-13" w.c.
- Outlet pressure setting:**  
Type 951 8" at 200 CFH  
Type 952 11" at 200 CFH
- Gases:** Natural Gas or Propane
- Code:** The four digit code indicates the year and the calendar week, in which the regulator was manufactured (i.e. 1012: in twelfth week of 2010)
- Ambient temp. range:** -40/205°F (-40/96°C)
- Pipe size NPT:** 3/4" x 3/4" - 1" x 1"
- Venting:** Vent limiter "0" 6-38 3/8" NPT
- Emergency exposure limits:** 65 PSIG (4.5 BAR) inlet side only
- Type 95** - L 5.964 x W 5.551 x H 5.196" - Weight: 47.625 oz.

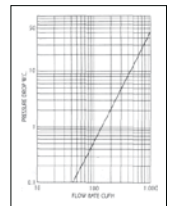
### Application

The Type 95 OARA pressure regulators are manufactured to supply the highest performances both as Line Pressure Regulators and Gas Appliance Regulators.

### Features

- Precise regulating control of both full flow and of tiny pilot flows.
- All models are approved by IAS, in accordance with the two different standards.
- Manufactured in order to fulfil utility specifications for usage in residential, commercial and industrial applications.
- Materials of all component parts are carefully selected and corrosion resistant.
- Diaphragm and washer are made of NITRILE RUBBER, which guarantees resistance to combustible gases.
- Rubber is selected to work at the following ambient temperatures: -40/205 °F (-40/96°C).
- Housings are made of rugged die-cast aluminium.
- Vent limiter is made of brass.
- Regulators are supplied with a vent limiter type "0"6-38 thread 1/8" NPT. In case of diaphragm rupture, gas leakage is limited within ANSI standard levels.
- Manufacturing of the regulators in terms of balancing capacity guarantees excellent control of the outlet pressure in case of absence of flow.

### PRESSURE DROP CHART



**CAPACITIES based on 1" w.c. pressure drop from set point 0.64 sp gr gas expressed in BTU (PROPANE stabilizer)**

Model	Outlet Pressure	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar	2 PSIG= 138 mbar	5 PSIG= 345 mbar
95	7" w.c.	570,000	632,000	701,000	810,000	1,011,000
	8" w.c.	563,000	618,000	701,000	798,000	997,000
	9" w.c.	536,000	597,000	674,000	784,000	997,000
	10" w.c.	516,000	591,000	632,000	777,000	983,000
	11" w.c.	473,000	564,000	583,000	741,000	962,000

**PRESSURE DROP - 0.64 sp gr gas expressed in CFH (m3/h)**

Press. drop	7.0" PSIG= 17 mbar	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar
<b>Flow rate CFH (m3/h)</b>	359 (10.1)	504 (14.3)	627 (17.7)	719 (20.3)

**CAPACITIES based on 1" w.c. pressure drop from set point 0.64 sp gr gas expressed in CFH (m3/h)**

Model	Outlet Pressure	1/2 PSIG= 34.5 mbar	3/4 PSIG= 52 mbar	1 PSIG= 69 mbar	2 PSIG= 138 mbar	5 PSIG= 345 mbar
95	7" w.c.	364 (10.3)	403 (11.4)	447 (12.7)	517 (14.6)	645 (18.3)
	8" w.c.	359 (10.2)	394 (11.2)	447 (12.7)	509 (14.4)	636 (18.0)
	9" w.c.	342 (9.7)	381 (10.8)	430 (12.2)	500 (14.2)	636 (18.0)
	10" w.c.	329 (9.3)	377 (10.7)	403 (11.4)	496 (14.0)	627 (17.8)
	11" w.c.	302 (8.5)	360 (10.2)	372 (10.5)	473 (13.4)	614 (17.8)

**Stabilizers**

**Type 96**



L 2.362 x W 1.811 x H 2.008 - Weight: 3.527 oz

**Type 97**



L 2.953 x W 2.283 x H 2.362 - Weight: 8.748 oz

**Type 98**



L 2.756 x W 2.972 x H 3.346 - Weight: 11.146 oz

**Application**

- The regulators are intended for primary use of MAIN BURNER AND PILOT LOAD applications, they feature precise regulating control of both full flow and of tiny pilot flows.
- All models are tested by IAS, in order to check a minimum capacity of 0.15 cfh G
- The regulators can be mounted in any positions. **WARNIG!** The regulators are adjusted in the upright position, in case of installations in different positions, little modifications of the pressure adjustment can occur.
- The vent hole is supplied with thread to allow the connection to an eventual line.
- The "L" models have been manufactured with FIXED ORIFICE on the cover which limits the leakage in case of diaphragm rupture.
- These products can be supplied with a pressure outlet tap in order to check the outlet pressure of the regulator during the installation.
- Materials of all component parts are carefully selected and corrosion-resistant.
- Diaphragm and washer are made of NITRILE RUBBER, which guarantees resistance to combustible gases.
- Rubber is selected to work at the following ambient temperatures: - 40/205 °F (-40/96°C).
- Housings are made of rugged die-cast aluminium.

**Technical Specifications**

**Rated inlet pressure:**

- Type 96: 1/2 PSI - 2 PSI
- Type 97: 1/2 PSI
- Type 98: 1/2 PSI

**Outlet pressure range:**

- Type 96: 2.8"-12" w.c. (version with fixed cap available - code F)
- Type 97: 2.8"-12" w.c.
- Type 98: 2.8"-12" w.c.

**PIPE SIZE NPT:**

- Type 96: 1/4" x 1/4" - 3/8" x 3/8"
  - Type 97: NPT 3/8" x 3/8" - 1/2" x 1/2"
  - Type 98: NPT 1/2" x 1/2" - 3/4" x 3/4"
- different threads available on request

**VENTING:** Standard orifice Ø 1,4 mm - Limited orifice Ø 0,35 mm

**Emergency exposure limits:** 2.5 PSI (172 mbar)

**Gases:** Natural Gas or Propane

**Ambient temp. range:** -40/205°F (-40/96°C)

Type	Venting	INDIVIDUAL M.B. (BTU/hr)	Range of regulation (BTU/hr)		Regul. capacity M.B. and PILOT (BTU/hr)		Press. Drop capacity at 1.0" W.C.
		MAX	MAX	MIN	MAX	MIN	
96	Thread 5/16" - 24	50,000	65,000	150	50,000	150	48,000
	Fixed orifice	30,000					
97	Thread 1/8" NPT	90,000	120,000	150	90,000	150	100,000
97L	Fixed orifice	40,000					
98	Thread 1/8" NPT	170,000	250,000	150	240,000	150	230,000
98L	Fixed orifice	40,000					

# Conversion Table

### Type 90 / 2-5 PSI

Type	Part Number	Pipe size	Inlet Pressure	Setting	Natural Gas	LPG
<b>90</b>	44-1-190-0002	1/2"	2 PSIG	8"	7" - 11" w.c.	-
	44-1-190-0004			7"		7" - 11" w.c.
	44-1-190-0006			11"	-	
	44-1-190-0008			11"	-	9" - 12" w.c.
	44-1-190-0009		5 PSIG	3.5"	2" - 6" w.c.	-
	44-1-190-0011			8"	7" - 11" w.c.	-
	44-1-190-0012			11"	-	7" - 11" w.c.
	44-1-190-0013			7"	-	7" - 11" w.c.
44-1-190-0016	11"	-	11"-13" w.c.			

### Type 95 / 2-5 PSI

Type	Part Number	Pipe size	Inlet Pressure	Setting	Natural Gas	LPG		
<b>95</b>	44-1-290-0002	3/4"	2 PSIG	8"	7" - 11" w.c.	-		
	44-1-290-0003			11"		-	7" - 11" w.c.	
	44-1-290-0010		5 PSIG	8"	-			7" - 11" w.c.
	44-1-290-0011			11"	-			7" - 11" w.c.
	44-1-290-0015		11"	-	11"-13" w.c.			

### Type 96 / 1/2 - 2-PSI

Mod.	Part No.	Pipe size	Ini. Press	Setting	N.C.	L.P.G.	
<b>96</b>	44-1-390-0003	3/8"	1/2 PSI	12"	-	8" - 12" w.c.	
	44-1-390-0004			11"		-	8" - 11" w.c.
	44-1-390-0005			5.8"	4" - 5.8" w.c.	-	
	44-1-390-0006			5"	2.8" - 5" w.c.		
	44-1-390-0008			10"	-	8" - 12" w.c.	
	44-1-390-0010			6"	4" - 8" w.c.	-	
	44-1-390-0013			10"	-	8" - 12" w.c.	
	44-1-390-0014			6"	4" - 8" w.c.	-	
	44-1-390-0016	1/4"	2 PSI	10"	-	8" - 12" w.c.	
	44-1-390-0019	1/2"			8" - 12" w.c.	-	
	44-1-390-0020	3/8"					
	44-1-390-0023	3/8"			-	-	
	44-1-390-0025	1/4"			4"	2.8" - 5.2" w.c.	-
	44-1-390-0026	3/8"			7"	-	-

### Type 97 - 1/2 PSI

Type	Part Number	Pipe size	Inlet Pressure	Setting	Natural Gas	LPG	Convertible
<b>97</b>	44-1-490-0005	1/2"	1/2 PSI	-	-	-	4" - 11" w.c.
	44-1-490-0019						5" - 10" w.c.
	44-1-490-0034						4" - 11" w.c.

### Type 98 - 1/2 PSI

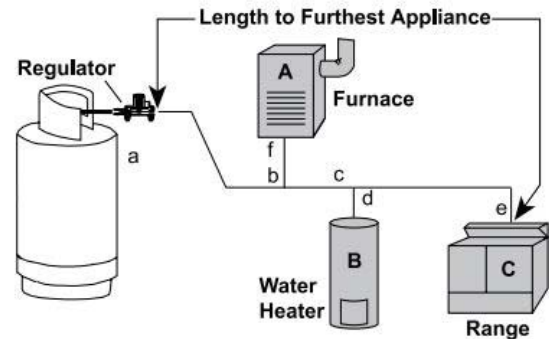
Type	Part Number	Pipe size	Inlet Pressure	Setting	Natural Gas	LPG	Convertible
<b>98</b>	44-1-590-0002	3/4"	1/2 PSI	4"	3.3" - 6" w.c.	-	-
	44-1-590-0017	1/2"		-	-		4" - 10" w.c.
	44-1-590-0019			4"	3.3" - 6" w.c.		-
	44-1-590-0020	3/4"		1/2"	-	-	-
	44-1-590-0025	4"			4" - 10" w.c.		
	44-1-590-0028	3/4"			-	-	4" - 11" w.c.

## Pipe and Tubing Selection Guide

Use the following simple method to assure the selection of the correct sizes of piping and tubing for LP-Gas vapor systems. Piping between the first and second stage is considered, as well as lower pressure (2 PSIG) piping between the 2 PSIG second stage or integral twin stage regulator and the line pressure regulator; and low pressure (inches of water column) piping between second stage, single stage, or integral twin stage regulators and appliances. The information supplied below is from NFPA 54 (National Fuel Gas Code) Appendix C, and NFPA 58 (Liquefied Petroleum Gas Code) Chapter 15; it can also be found in CETP (Certified Employee Training Program) published by the Propane Education and Research Council "Selecting Piping and Tubing" module 4.1.8. These illustrations are for demonstrative purposes, they are not intended for actual system design.

### Instructions:

1. Determine the total gas demand for the system by adding up the BTU/hr input from the appliance nameplates and adding demand as appropriate for future appliances.
2. For second stage or integral twin stage piping:
  - A. Measure length of piping required from outlet of regulator to the appliance furthest away. No other length is necessary to do the sizing.
  - B. Make a simple sketch of the piping, as shown.
  - C. Determine the capacity to be handled by each section of piping. For example, the capacity of the line between a and b must handle the total demand of appliances A, B, and C; the capacity of the line from c to d must handle only appliance B, etc.
  - D. Using Table 3 select proper size of tubing or pipe for each section of piping, using values in BTU/hr for the length determined from step #2-A. If exact length is not on chart, use next longer length. Do not use any other length for this purpose! Simply select the size that shows at least as much capacity as needed for each piping section.
3. For piping between first and second stage regulators
  - A. For a simple system with only one second stage regulator, merely measure length of piping required between outlet of first stage regulator and inlet of second stage regulator. Select piping or tubing required from Table 1.
  - B. For systems with multiple second stage regulators, measure length of piping required to reach the second stage regulator that is furthest away. Make a simple sketch, and size each leg of piping using Table 1, 2, or 3 using values shown in column corresponding to the length as measured above, same as when handling second stage piping.



### Example 1

Determine the sizes of piping or tubing required for the twin-stage LP-Gas installation shown.

**Total piping length = 84 feet (use Table 3 @90 feet)**

From a to b, demand = 38,000 + 35,000 + 30,000

= 103,000 BTU/hr; use 3/4" pipe

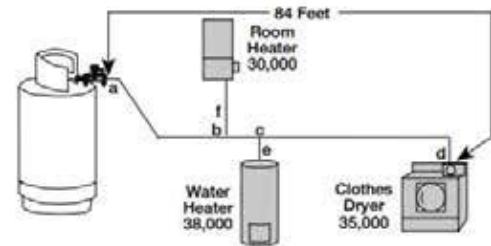
From b to c, demand = 38,000 + 35,000

= 73,000 BTU/hr; use 1/2" pipe or 3/4" tubing

From c to d, demand = 35,000 BTU/hr; use 1/2" pipe or 5/8" tubing

From c to e, demand = 38,000 BTU/hr; use 1/2" pipe or 5/8" tubing

From b to f, demand = 30,000 BTU/hr; use 1/2" pipe or 1/2" tubing



### Example 2

Determine the sizes of piping or tubing required for the two-stage LP-Gas installation shown.

**Total first stage piping length = 26 feet; first stage regulator setting is 10psig (use Table 1 or 2 @ 30 feet)**

From aa to a, demand = 338,000 BTU/hr; use 1/2" pipe, 1/2" tubing, or 1/2" T plastic pipe.

Total second stage piping length = 58 feet (use Table 3 @ 60 feet)

From a to b, demand = 338,000 BTU/hr; use 1" pipe

From b to c, demand = 138,000 BTU/hr; use 3/4" pipe or 7/8" tubing

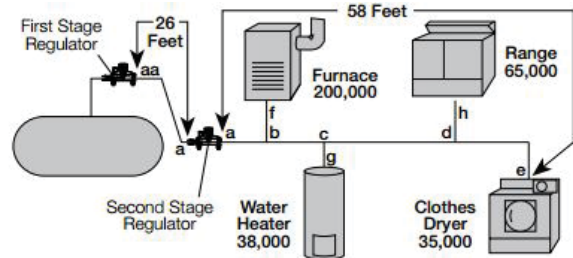
From c to d, demand = 100,000 BTU/hr; use 1/2" pipe or 3/4" tubing

From d to e, demand = 35,000 BTU/hr; use 1/2" pipe or 1/2" tubing

From b to f, demand = 200,000 BTU/hr; use 3/4" pipe or 7/8" tubing

From c to g, demand = 38,000 BTU/hr; use 1/2" pipe or 1/2" tubing

From d to h, demand = 65,000 BTU/hr; use 1/2" pipe or 5/8" tubing



### Example 3

Determine the sizes of piping or tubing required for the 2 PSI LP-Gas installation shown.

**Total first stage piping length = 26 feet; first stage regulator setting is 10psig (use Table 1 or 2 @ 30 feet)**

Total 2 PSI Piping Length = 19 ft. (use Table 4 @ 20 ft. or Table 6 @ 20 ft.)

From aa to a, demand= 338,000 BTU

use 3/8" CSST or 1/2" copper tubing or 1/2" pipe

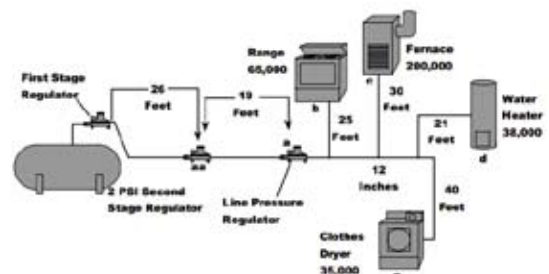
From Regulator a to each appliance:

From a to b, demand= 65,000 BTU; length = 25 ft. (Table 5), use 1/2" CSST

From a to c, demand= 200,000 BTU; length = 30 ft. (Table 5) use 3/4" CSST

From a to d, demand= 38,000 BTU; length = 21 ft.\* (Table 5) use 3/8" CSST \*use 25 ft. column

From a to e, demand= 35,000 BTU; length = 40 ft. (Table 5) use 1/2" CSST





# Pipe and Tubing Selection Guide

**Table 1 – First Stage Pipe Sizing** (Between First and Second Stage Regulators) 10 PSIG Inlet with a 1 PSIG Pressure Drop Maximum capacity of pipe or tubing, in thousands of BTU/hr or

Size of Pipe or		Length of Pipe or Tubing, Feet																			
Copper Tubing, Inches		10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
Copper Tubing (O.D.) Pipe Size	3/8"	558	383	309	265	235	213	196	182	171	161	142	130	118	111	104	90	89	89	82	76
	1/2"	1387	870	700	599	531	481	443	412	386	365	323	293	269	251	235	222	211	201	185	172
	5/8"	2360	1622	1303	1115	988	896	824	767	719	679	601	546	502	467	438	414	393	375	345	321
	3/4"	3993	2475	2205	1887	1672	1515	1394	1297	1217	1149	1018	923	843	790	740	700	664	634	584	543
	1/2"	3339	2295	1843	1577	1398	1267	1165	1084	1017	961	852	772	710	660	619	585	556	530	488	454
	3/4"	6982	4799	3854	3298	2923	2649	2437	2267	2127	2009	1780	1613	1484	1381	1296	1224	1162	1109	1020	949
	1"	13153	9040	7259	6213	5507	4989	4590	4270	4007	3785	3354	3039	2796	2601	2441	2305	2190	2089	1922	1788
	1 1/4"	27004	18560	14904	12756	11306	10244	9424	8767	8226	7770	6887	6240	5741	5340	5011	4733	4495	4289	3945	3670
	1 1/2"	40461	27809	22331	19113	16939	15348	14120	13136	12325	11642	10318	9349	8601	8002	7508	7092	6735	6426	5911	5499
2"	77924	53556	43008	36809	32623	29559	27194	25299	23737	22422	19871	18005	16564	15410	14459	13658	12971	12375	11385	10591	

**Table 2 – First Stage Plastic Tubing Sizing** 10 PSIG Inlet with a 1 PSIG Pressure Drop - Maximum capacity of plastic tubing in thousands of BTU/hr of LP-Gas

Size of Plastic Tubing		Length of Tubing, Feet*																			
NPS	SDR	10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
1/2 CTS	7.00	1387	954	762	653	578	524	482	448	421	397	352	319	294	273	256	242	230	219	202	188
1/2	9.33	3901	2681	2143	1835	1626	1473	1355	1261	1183	1117	990	897	826	778	721	681	646	617	567	528
1/2	11.00	7811	5369	4292	3673	3256	2950	2714	2525	2369	2238	1983	1797	1653	1539	1443	1363	1294	1235	1136	1057
1 CTS	11.00	9510	6536	5225	4472	3864	3591	3304	3074	2884	2724	2414	2188	2013	1872	1757	1659	1576	1503	1383	1287
1	11.00	14094	9687	7744	6628	5874	5322	4896	4555	4274	4037	3578	3242	2983	2775	2603	2459	2336	2228	2050	1907
1 1/4	10.00	24416	16781	13416	11482	10106	9220	8433	7891	7404	6994	6199	5616	5167	4807	4510	4260	4046	3860	3551	3304
1 1/2	11.00	-	-	20260	17340	15368	13924	12810	11918	11182	10562	9361	8482	7803	7259	6811	6434	6111	5830	5363	4989
2	11.00	66251	45534	36402	31155	27612	25019	23017	21413	20091	18978	16820	15240	14020	13043	12238	11560	10979	10474	9636	8965

**Table 3 – Second Stage or Integral Twin Stage Pipe Sizing** 11 Inches Water Column Inlet with a 1/2 Inch Water Column Drop Maximum capacity of pipe or tubing in thousands of BTU/hr of LP-Gas

Size of Pipe or		Length of Pipe or Tubing, Feet																			
Copper Tubing,		10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
Copper Tubing (O.D.) Pipe Size	3/8"	49	34	27	23	20	19	-	16	-	14	12	11	-	10	-	9	-	8	7	7
	1/2"	110	76	61	52	46	42	38	36	33	32	28	26	-	22	-	19	-	18	16	15
	5/8"	206	141	114	97	86	78	71	67	62	59	52	48	-	41	-	36	-	33	30	28
	3/4"	348	239	192	164	146	132	120	113	105	100	89	80	-	69	-	61	-	55	51	47
	7/8"	536	368	296	253	224	203	185	174	161	154	137	124	-	106	-	94	-	85	78	73
	1/2"	291	200	161	137	122	110	102	94	87	84	74	67	62	58	54	51	48	46	43	40
	3/4"	608	418	336	287	255	231	212	198	185	175	155	141	129	120	113	107	101	97	89	83
	1"	1146	788	632	541	480	435	400	372	349	330	292	265	244	227	213	201	191	182	167	156
	1 1/4"	2353	1617	1299	1111	985	892	821	764	717	677	600	544	500	465	437	412	392	374	344	320
	1 1/2"	3525	2423	1946	1665	1476	1337	1230	1144	1074	1014	899	815	749	697	654	618	587	560	515	479
2"	6789	4666	3747	3207	2842	2575	2369	2204	2068	1954	1731	1569	1443	1343	1260	1190	1130	1078	992	923	

**Table 4-Maximum Capacity of CSST** In Thousands of BTU per hour of undiluted LP-Gases Pressure of 2 psi and a pressure drop of 1 psi (Based on a 1.52 Specific Gravity Gas)

Size	Designation	10	20	30	40	50	75	80	110	150	200	250	300	400	500
3/8"	13	426	262	238	203	181	147	140	124	101	86	77	69	60	53
	15	558	347	316	271	243	196	189	169	137	118	105	96	82	72
1/2"	18	927	591	540	469	420	344	333	298	245	213	191	173	151	135
	19	1106	701	640	554	496	406	393	350	287	248	222	203	175	158
3/4"	23	1735	1120	1027	896	806	663	643	578	477	415	373	343	298	268
	25	2168	1384	1266	1100	986	809	768	703	575	501	448	411	355	319
1"	30	4097	2560	2331	2012	1794	1457	1410	1256	1021	880	785	716	616	550
	31	4720	2954	2692	2323	2072	1685	1629	1454	1182	1019	910	829	716	638

## Pipe and Tubing Selection Guide

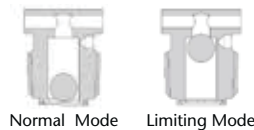
**Table 5-Maximum Capacity of CSST In Thousands of BTU per hour of undiluted LP-Gases Pressure of 11 Inch Water Column and a Pressure Drop of 0.5 Inch Water Column (Based on a 1.52 Specific Gravity Gas)**

Size	Designation	5	10	15	20	25	30	40	50	60	70	80	90	100	150	200	250	300
3/8"	13	72	50	39	34	30	28	23	20	19	17	15	15	14	11	9	8	8
	15	99	69	55	49	42	39	33	30	26	25	23	22	20	15	14	12	11
1/2"	18	181	129	104	91	82	74	64	58	53	49	45	44	41	31	28	25	23
	19	211	150	121	106	94	87	74	66	60	57	52	50	47	36	33	30	26
3/4"	23	355	254	208	183	164	151	131	118	107	99	94	90	85	66	60	53	50
	25	426	303	248	216	192	177	153	137	126	117	109	102	98	75	69	61	57
A J J I	30	744	521	422	365	325	297	256	227	207	191	178	169	159	123	112	99	90
	31	863	605	490	425	379	344	297	265	241	222	208	197	186	143	129	117	107

**Table 6 – Copper Tube Sizing or Schedule 40 Pipe Sizing In Thousands of BTU per hour of undiluted LP-Gases 2 PSIG inlet with a 1PSIG pressure drop (Between 2 PSIG service regulator & line pressure regulator).**

Size of Pipe or		Length of Pipe or Tubing, Feet																			
Copper Tubing,		10	20	30	40	50	60	70	80	90	100	150	200	250	300	350	400	450	500	600	700
Copper Tubing (O.D.)	3/8"	451	310	249	213	189	171	157	146	137	130	104	89	79	72	66	61	58	54	49	45
	1/2"	1020	701	563	482	427	387	356	331	311	294	236	202	179	162	149	139	130	123	111	102
	5/8"	1900	1306	1049	898	795	721	663	617	579	547	439	376	333	302	278	258	242	229	207	191
	3/4"	3215	2210	1774	1519	1346	1219	1122	1044	979	925	743	636	563	511	470	437	410	387	351	323
	1/2"	2687	1847	1483	1269	1125	1019	938	872	819	773	621	531	471	427	393	365	343	324	293	270
Pipe Size	3/4"	5619	3862	3101	2654	2352	2131	1961	1824	1712	1617	1298	1111	985	892	821	764	717	677	613	564
	1"	10585	7275	5842	5000	4431	4015	3694	3436	3224	3046	2446	2098	1855	1681	1546	1439	1350	1275	1155	1063
	1 1/4"	21731	14936	11994	10265	9098	8243	7584	7055	6620	6253	5021	4298	3809	3451	3175	2954	2771	2618	2372	2182
	1 1/2"	32560	22378	17971	15381	13632	12351	11363	10571	9918	9369	7524	6439	5707	5171	4757	4426	4152	3922	3554	3270
	2"	62708	43099	34610	29621	26253	23787	21884	20359	19102	18043	14490	12401	10991	9959	9162	8523	7997	7554	6844	6297

## Accessories



### Vent Limiter

#### Code 19-1-190-0004

Vent limiters are designed for use indoors and in spaces where limiting the amount of gas escapement due to diaphragm failure is critical. vent limiters should not be used outdoors if they are exposed to the environment. A vent limiting orifice or device does not release or relieve gas into the environment during normal operation. Connection: 3/8" NPT

Connections	Approximate Length
Vent limiter for use only with natural, manufactured, mixed gases and LP gas-air mixtures	2.5 (19.6)
Vent limiter for use with liquefied petroleum gases	1.0 (7.9)

### Vent Protector

#### Code 19-1-190-0003

Designed for outdoor applications. Use on vent opening to protect breather hole from rain, snow, foreign particles and insects. Vent protector MUST be mounted in an upright position. For outdoor use with Pressure Line Regulators. Not a vent limiting device. Connection: 1 /8" NPT