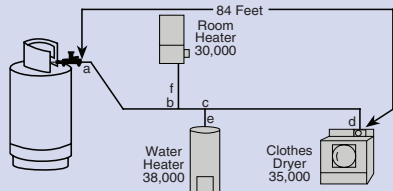


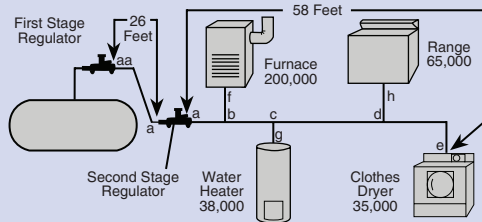
Gas piping and regulator installation should be done by a qualified technician. Improper installation can cause property damage and/or personal injury can occur.

Example 1:
Determine the sizes of piping or tubing required for the twin-stage LP-Gas installation shown:



Total piping length = 84 ft (use Table 3 @ 90 ft)
 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 10 PSIG (use Table 1 or 2 @ 30 ft)
 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 pipping length = 58 feet (use Table 3 @ 60 ft)
 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

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 1000's of BTU/hr of LP-Gas

SIZE OF PIPE OR COPPER TUBING, INCHES	LENGTH OF PIPE OR TUBING, FEET																				
	10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400	
COPPER TUBING (O.D.)	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
PIPE SIZE	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	

*Total length of piping from outlet of first stage regulator to inlet of second stage regulator (or to inlet of second stage regulator furthest away).

Notes: 1) To allow 2 PSIG pressure drop, multiply total gas demand by .707, and use capacities from table.
 2) For different first stage pressures, multiply total gas demand by the following factors, and use capacities from table.
 Ex: 1,000,000 BTU load at 5 PSI: 1,000,000 (1.2) = 1,200,000 BTU then use chart bases on 1,200,000 BTU

First Stage Pressure PSIG	Multiply By
20	.844
15	.912
5	1.120

Data Calculated per NFPA #54 & 58

First Stage Plastic Tubing Sizing

10 PSIG Inlet with a 1 PSIG Pressure Drop

Maximum capacity of plastic tubing in 1000's of BTU/hr of LP-Gas

SIZE OF PLASTIC TUBING	LENGTH OF PIPE OR TUBING, FEET																			
	10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	300	350	400	
NPS																				
1/2T	7	1287	954	766	655	581	526	484	450	423	399	354	321	295	274	257	243	220	203	189
3/4	11	7811	5389	4311	3690	3270	2963	2726	2536	2379	2248	1992	1805	1660	1545	1499	1369	1241	1141	1062
1	11	14094	9687	7779	6658	5901	5346	4919	4578	4293	4044	3594	3257	2996	2787	2615	2470	2238	2059	1916
1-14	10	24416	16781	13476	11534	10222	9262	8521	7927	7438	7026	6226	5642	5190	4829	4531	4280	3878	3567	3318
2"	11	66251	45534	36566	31295	27737	25131	23120	21509	20181	19063	16895	15308	14084	13102	12293	11612	10521	9680	9005

*Total length of piping from outlet of first stage regulator to inlet of second stage regulator or to inlet of second stage regulator furthest away.

First Stage Pressure PSIG	Multiply By
20	.844
15	.912
5	1.120

Data Calculated per NFPA #54 & 58

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 1000's of BTU/hr of LP-Gas

SIZE OF PIPE OR COPPER TUBING, INCHES	LENGTH OF PIPE OR TUBING, FEET																				
	10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400	
COPPER TUBING (O.D.)	3/8	49	34	27	23	20	19	—	—	—	—	—	—	—	—	—	—	—	—	—	
	1/2	110	76	61	52	46	42	38	36	33	32	—	—	—	—	—	—	—	—	—	
	5/8	206	151	114	97	86	78	71	67	62	59	—	—	—	—	—	—	—	—	—	
	3/4	348	239	192	164	146	132	120	113	105	100	—	—	—	—	—	—	—	—	—	
	7/8	536	368	296	253	224	203	185	174	161	154	—	—	—	—	—	—	—	—	—	
PIPE SIZE	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	226	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

*Total length of piping from outlet of regulator to appliance furthest away.

Data Calculated per NFPA #54 & 58

RESIDENTIAL/COMMERCIAL

Quick Reference Guide For Perfection

Permasert® Polyethylene Mechanical Fittings and Risers

Make sure you are thoroughly trained before you attempt any regulator installations.
Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Polyethylene piping systems shall be limited to: 1) Vapor service not exceeding 30 psig 2) Installation outdoors and underground with a minimum of 18" of cover, except the cover may be reduced to 12", if external damage to the pipe is not likely to result. Check your local codes.

Mechanical Couplings

Part #	Size	SDR/Wall
50100	1/2" CTS	.090
50030	3/4" IPS	SDR 11
50601	1" IPS	
50035010	1-1/4" IPS	SDR 10
50314	2" IPS	SDR 11



Coppersert™ Copper to PE Fittings

Size	Part #
1/2" CTS x 3/8" Flare	41007
1/2" CTS x 1/2" Flare	41013
1/2" CTS x 5/8" Flare	41002
3/4" IPS x 5/8" Flare	41130
1" CTS x 5/8" Flare	41150



Permasert Three-Way Tees

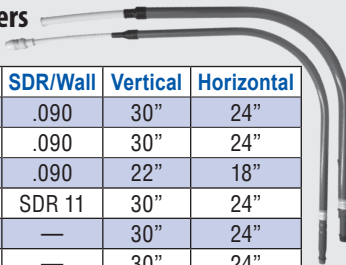
Part #	Size	SDR/Wall
50199	1/2" CTS	.090
50929	3/4" IPS	SDR 11
50634	1" IPS	
50327010	1-1/4" IPS	SDR 10
50316	2" IPS	SDR 11



Anodeless Service Line Risers

Permasert Mechanical Ends

Part #	Outlet	Inlet	SDR/Wall	Vertical	Horizontal
77253	1/2" MPT	1/2" CTS	.090	30"	24"
75192	3/4" MPT	1/2" CTS	.090	30"	24"
77201	3/4" MPT	1/2" CTS	.090	22"	18"
79209	3/4" MPT	3/4" IPS	SDR 11	30"	24"
78442	1" MPT	1" IPS	—	30"	24"
75901	1-1/4" MPT	1-1/4" IPS	—	30"	24"
75906	2" IPS	2" IPS	SDR 11	30"	15"



Polyethylene Piping

Part #	Size	Coil Length	I.D.	Nominal O.D.	SDR	Minimum Wall Thickness
PP-1/2CTS	Medium density polyethylene piping	500 ft.	1/2"	0.625"	7	.090"
PP-3/4IPS			3/4"	1.050"	11	.095"
PP-1IPS			1"	1.315"	10	.120"
PP-1 1/4IPS			1-1/4"	1.660"	10	.166"
PP-2IPS		250 ft.	2"	2.375"	11	.216"



Anodeless Servi-Sert® Field-Assembled All-flex Risers* (with Swivel Connector/Union)

Part #	Outlet	Inlet	Overall Length
71353	1/2" MNPT	1/2 CTS Poly Pipe	84"
71354			36"
71355	3/4" MNPT	3/4" IPS	84"
71356			36"
71412			84"
71410			36"
71411			60"



Servi-Sert® Replacement Service Head Adaptors

Part #	Outlet	Inlet	Service head adaptors ONLY
71110	1/2" MNPT	1/2" CTS	Service head adaptors ONLY
71100	3/4" MNPT	3/4" IPS	
71161		3/4" IPS	

Approved by NFPA-58, 1998 Edition (Check Local Jurisdictions.)

Tools and Accessories

Part #	Description	Size
51016	Chamfering tool	1/2" CTS x 3/4" IPS
51008		3/4" IPS x 1" IPS
51028		1-1/4" IPS
51040		2" IPS
55290	Plastic cutter	Snips 1/8"-1 1/2" OD
55291		Snips 1/8"-2 3/8" OD

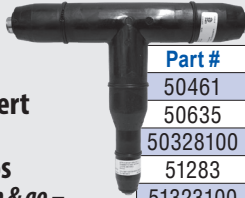


NOTE: The above part numbers represent our most popular components. For other sizes or custom configurations, please inquire.

Permasert Blind End Caps

Caps: stop & go – both ends functional

Part #	Size	SDR/Wall
50016	1/2" CTS	.090
50026	3/4" IPS	SDR 11
50033	1-1/4" IPS	SDR 10
50317	2" IPS	SDR 11



Repair Couplings

Part #	Size	SDR/Wall	Length
50056	1/2" CTS	.090	12"
50175	3/4" IPS	SDR 11	
50640	1" IPS	SDR 11	
50320100	1-1/4" IPS	SDR 10	
50341	2" IPS	SDR 11	15"

NOTE: Polyethylene pipe/tubing shall be limited to vapor service, not exceeding 30 psig, and must be installed outdoors and underground.

Transition Fittings

Part #	Description	Size	Approximate Dimension
700004	Transition, threaded	1/2" MNPT x 1/2" CTS	16-1/2"
700205		3/4" MNPT x 1/2" CTS	16"
700802		3/4" MNPT x 3/4" IPS	17"
707202		1" MNPT x 1" IPS	17"
702205		1-1/4" MNPT x 1-1/4" IPS	16-1/2"
702602		2" MNPT x 2" IPS	18-1/2"



Permasert Reducing Couplings

Part #	Size	SDR/Wall	Size	SDR/Wall
50149	1/2" CTS	.090	1" CTS	.099"/.103"
50969			3/4" IPS	SDR 11
51432	1" IPS	SDR 11	1" IPS	SDR 11
50343010	1-1/4" IPS	SDR 10		
50333010	IPS			



Locator Tape and Wire

Tracer Tape should be placed in trench a minimum of 6" above polyethylene pipe. The metallic tape allows for easy location of plastic pipe with metal detector.



Part #	Description	Coil Length
715-NCGT21	Metallic locator tape	2" x 1,000 ft. roll
NO.12	PE coated copper #12"	500 ft. roll

Permasert Elbows

Part #	Size	SDR/Wall
50294	1/2" CTS	.090
51620	3/4" IPS	SDR 11
50636	1" IPS	
50325010	1-1/4" IPS	SDR 10
50315	2" IPS	SDR 11

