

COLUMBIA GAS OF KENTUCKY, INC.

CLASSIFICATION OF SERVICE
 General Gas Service

Schedule G-1
 (Lexington Division)

Rate
 Per Unit

APPLICABILITY

See Sheet 2-A for Applicability.

AVAILABILITY OF SERVICE

Available for general residential, commercial and industrial service. This Rate Schedule is not available for the purchase from Seller of natural gas to be used by Buyer as boiler fuel in an amount exceeding two thousand (2,000) Mcf on any one day; provided, however, that this limitation shall not apply to gas used to provide space heating or air-conditioning.

RATE (R)

First	1,000 cubic feet, or the right thereto, used through each meter each month	\$2.0804
Next	49,000 cubic feet used through each meter each month - per Mcf	.8254
Next	50,000 cubic feet used through each meter each month - per Mcf	.7854
Next	200,000 cubic feet used through each meter each month - per Mcf	.7554
All Over	300,000 cubic feet used through each meter each month - per Mcf	.7254

MINIMUM CHARGE

The minimum charge per month shall be \$2.03.

PENALTIES OR DISCOUNTS

None.

3-9-66

CHECKED
 PUBLIC SERVICE COMMISSION
 JUN 14 1965
 by *R.D.*
 ENGINEERING DIVISION

PURCHASED GAS ADJUSTMENT (T)

The above rates are subject to such increase or decrease as may be authorized by the Public Service Commission of Kentucky pursuant to the Purchased Gas Adjustment provision heretofore prescribed by the Public Service Commission of Kentucky, by Order issued in Case No. 4402 as follows:

(R) Reduction (T) Change in Text

DATE OF ISSUE: May 24, 1965 DATE EFFECTIVE: With meter readings on and after April 5, 1965

Issued by: *G. H. ...* Senior Vice President Charleston, W. Va.
 Name of Officer Title Address

Issued by authority of Orders of the Public Service Commission of Kentucky in Case No. 4402 dated October 16, 1964 and May 4, 1965.

COLUMBIA GAS OF KENTUCKY, INC.

Schedule G-1
(Cont'd.)

The rates authorized herein are based upon the wholesale cost of gas to the Applicant as computed upon rates of its wholesale suppliers then currently in effect as of January 1, 1965, (Demand \$2.36 - Commodity \$.2959), under Federal Power Commission tariffs for interstate business or under wholesale tariffs of this Commission. For the purpose of this purchased gas adjustment clause, these rates shall be considered as the base rate for purchased gas. In the event there is an increase in this base rate, the Applicant shall within thirty days from the time it receives notice of the proposed change file with this Commission the following information:

- (1) A copy of the Federal Power Commission tariff or wholesale tariff of this Commission effecting the change in the base rates and a statement relative to the effective date of such proposed change.
- (2) A statement setting out the details of gas purchased under the provisions of the base rate for the previous twelve months showing billing under the base rate and under the proposed revised rate applicable to this service.
- (3) A balance sheet as of the end of the latest twelve month period and a statement of operating expenses and revenues in the same detail as reported to this Commission in the Utility's Annual Report.
- (4) A forecast showing the estimated gas purchases from all of the utilities contract suppliers for the next twelve months period together with an estimate of the cost thereof.
- (5) Such other information as this Commission may request for a proper determination of the purchased gas adjustment.

3-9-66

CHECKED
PUBLIC SERVICE COMMISSION
JUN 14 1965
by R.D.
ENGINEERING DIVISION

DATE OF ISSUE: May 24, 1965 DATE EFFECTIVE: With meter readings on and after April 5, 1965

Issued by: Ch. Moorhead Senior Vice President Charleston, W. Va.
Name of Officer Title Address

Issued by authority of Orders of the Public Service Commission of Kentucky in Case No. 4402 dated October 16, 1964 and May 4, 1965.

Schedule G-2
(Cont'd.)

The rates authorized herein are based upon the wholesale cost of gas to the Applicant as computed upon rates of its wholesale suppliers then currently in effect as of January 1, 1965, (Demand \$1.98 - Commodity \$.2864), under Federal Power Commission tariffs for interstate business or under wholesale tariffs of this Commission. For the purpose of this purchased gas adjustment clause, these rates shall be considered as the base rate for purchased gas. In the event there is an increase in this base rate, the Applicant shall within thirty days from the time it receives notice of the proposed change file with this Commission the following information:

- (1) A copy of the Federal Power Commission tariff or wholesale tariff of this Commission effecting the change in the base rates and a statement relative to the effective date of such proposed change.
- (2) A statement setting out the details of gas purchased under the provisions of the base rate for the previous twelve months showing billing under the base rate and under the proposed revised rate applicable to this service.
- (3) A balance sheet as of the end of the latest twelve month period and a statement of operating expenses and revenues in the same detail as reported to this Commission in the Utility's Annual Report.
- (4) A forecast showing the estimated gas purchases from all of the utilities contract suppliers for the next twelve months period together with an estimate of the cost thereof.
- (5) Such other information as this Commission may request for a proper determination of the purchased gas adjustment.

3-9-66

Upon receipt of this information this Commission will review the effect of the revised base rate on the operations of the Applicant and will prior to the effective date of the revised base rate, but not less

CHECKED
PUBLIC SERVICE COMMISSION
JUN 1 1965
ENGINEERING DIVISION

DATE OF ISSUE: May 24, 1965 DATE EFFECTIVE: With meter readings on and after April 5, 1965
Issued by: Ch. H. ... Senior Vice President Charleston, W. Va.
Name of Officer Title Address
Issued by authority of Orders of the Public Service Commission of Kentucky in Case No. 4401 dated October 16, 1964 and May 4, 1965.

COLUMBIA GAS OF KENTUCKY, INC.

Schedule I-1
(Cont'd.)

Rate
Per Unit

RATE (R)

First	800 Mcf	each month per Mcf	\$.5362
Next	1,200 Mcf	each month per Mcf	.5162
Next	3,000 Mcf	each month per Mcf	.5062
Next	5,000 Mcf	each month per Mcf	.4962
All Over	10,000 Mcf	each month per Mcf	.4762

MINIMUM CHARGE

A minimum charge of \$414.72 per month shall be made for each billing month during the term of the contract or service agreement, for gas delivered or the right of the customer to receive the same.

In the event of curtailment or interruption in the delivery of gas by the Company, or complete or partial suspension of operation by the customer due to strikes, fires, floods, explosions, or other catastrophe, the minimum charge shall be reduced in direct proportion to the ratio which the number of days of curtailed service or complete or partial suspension of operation bears to the total number of days in the billing month.

PURCHASED GAS ADJUSTMENT (T)

The above rates are subject to such increase or decrease as may be authorized by the Public Service Commission of Kentucky pursuant to the Purchased Gas Adjustment provision heretofore prescribed by the Public Service Commission of Kentucky, by Order issued in Case No. 4402 as follows:

The rates authorized herein are based upon the wholesale cost of gas to the Applicant as computed upon rates of its wholesale suppliers then currently in effect as of January 1, 1965, (Demand \$2.36 - Commodity \$.2959), under Federal Power Commission tariffs for interstate business or under wholesale tariffs of this Commission. For the purpose of this purchased gas adjustment clause, these rates shall be considered as the base rate for purchased gas. In the event there is an increase in this base rate, the Applicant shall within thirty days from the time it receives notice of the proposed change file with this Commission the following information:

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PUBLIC SERVICE COMMISSION
JUN 14 1965
by R.D.
ENGINEERING DIVISION

- (R) Reduction
- (T) Change in Text

3-9-66

DATE OF ISSUE: May 24, 1965 DATE EFFECTIVE: With meter readings on and after April 5, 1965

Issued by: G. H. ... Senior Vice President Charleston, W. Va.
Name of Officer Title Address

Issued by authority of Orders of the Public Service Commission of Kentucky in Case No. 4402 dated October 16, 1964 and May 4, 1965.

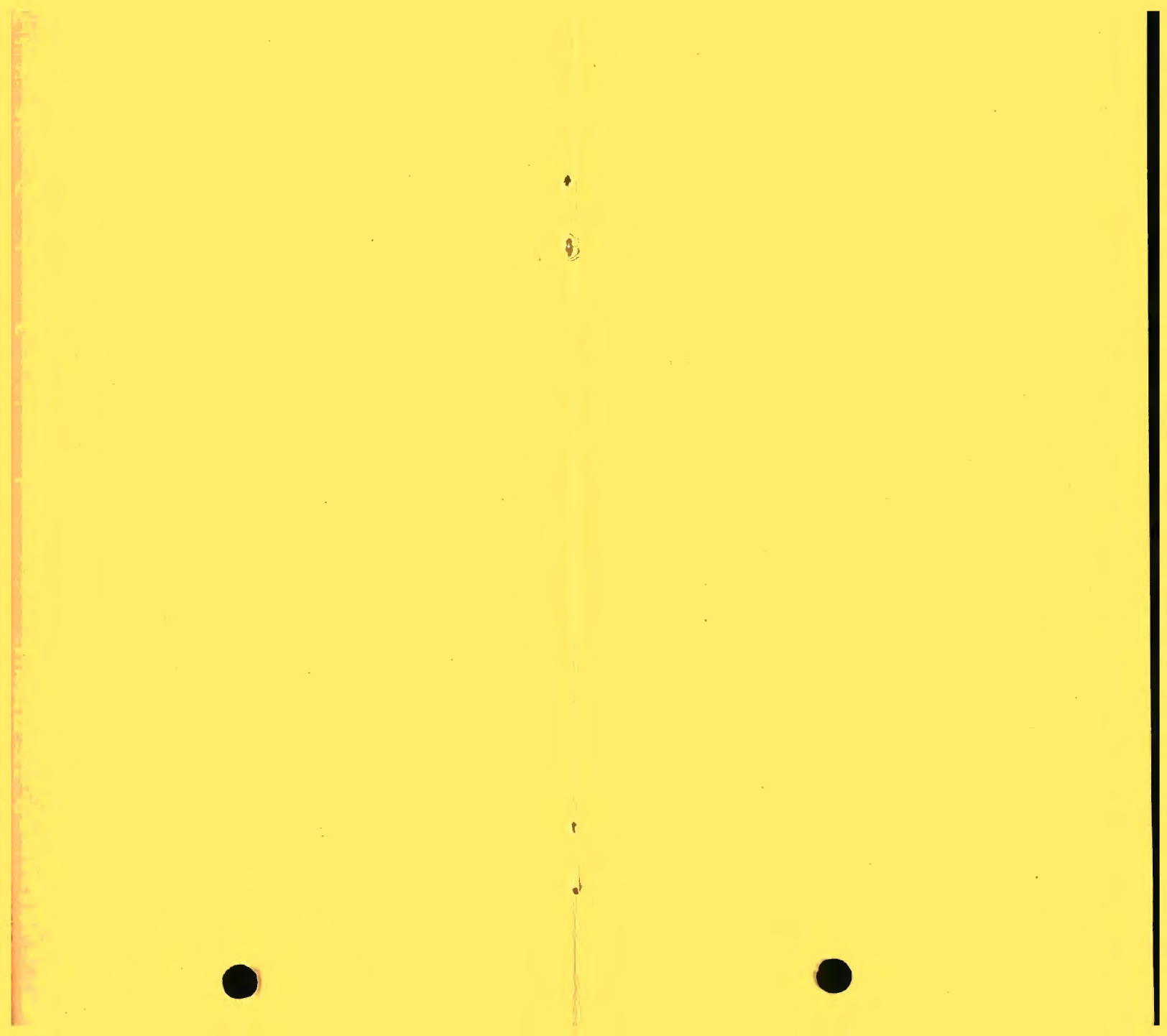
10-24-66

SYSTEM
REQUIREMENTS
FOR
GAS PIPING AND APPLIANCE
VENTING ON CUSTOMER'S
PREMISES



COLUMBIA GAS SYSTEM

May 1963



Presented For The Use Of

by
COLUMBIA GAS SYSTEM

May 1963

For further information concerning these Requirements
and Specifications call Telephone.....

NOTES

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Spread of Connections Center to Center	Meter Bar (A) Center to Center	Approximate Dimensions			
		Height		Width Over All	Front to Back
		With Swivels	Less Swivels		
6	7	16 ³ / ₄	13 ³ / ₄	9 ⁵ / ₈	8 ¹ / ₂
6	7	16 ³ / ₄	13 ³ / ₄	9 ⁵ / ₈	8 ¹ / ₂
8 ¹ / ₄	—	18	14 ⁷ / ₈	10 ³ / ₄	10 ³ / ₁₆
11	—	23 ¹ / ₂	23 ¹ / ₂ (C)	14 ¹ / ₈	13 ¹ / ₄
6	7	18	15	9	11
6 ⁷ / ₈	7	19	15 ¹ / ₂	10	11
8 ¹ / ₄	—	22	18	13	13
8 ¹ / ₄	—	22	18	13	13
11	—	26	22	16	15 ¹ / ₄
11	—	25 ¹ / ₂	21 ¹ / ₂	15 ¹ / ₂	15 ³ / ₄
13 ¹ / ₈	—	31	26	18	18
17 ¹ / ₄	—	—	30	19	18
21 ¹ / ₂	—	—	35	23	26
26	—	—	45	30	29
6	7	18	15	9	8
7	7	21	18	12	10
7 ³ / ₄	—	25	22	15	11
11	—	30	27	19	13
6	7	18	14	10	8
6	7	18	14	10	8
7 ³ / ₁₆	7	19	16	11	9
6 ³ / ₄	—	21	18	12	10
10	—	27	22 ¹ / ₂	16	14
10 ⁷ / ₈	—	30	25	18	16
10 ⁷ / ₈	—	32	27	18	16
6	7	17	13	10	9
7	7	18	14 ¹ / ₂	11	10
8	—	21	17	13	10
20 ³ / ₈	—	—	26	21	14
22 ¹ / ₂	—	—	28	23	17
26 ¹ / ₂	—	—	33	28	20
37	—	—	51 ¹ / ₂	40	21
6	7	17	13	10	9
6	7	18	14 ¹ / ₂	11	10
8	—	21	17	13	10
11	—	23 ³ / ₄	23 ³ / ₄ (C)	17	13 ³ / ₄
11	—	23 ³ / ₄	23 ³ / ₄ (C)	17	13 ³ / ₄
6	7	17	14	10 ¹ / ₄	9 ¹ / ₄
11 ¹ / ₄	11	20	17	13	10
13 ¹ / ₂	11	21	18 ¹ / ₂	15	12
16	16	26	22	18	13
18	18	31	26 ¹ / ₂	20	15

(B) For the larger capacity tin meters and hardcase meters with horizontal connections consult the Gas Company.

(C) Index on top of meter is higher than top of swivel when set.

METER SPECIFICATIONS: VERTICAL CONNECTIONS

All Dimensions in Inches

<u>HARDCASE METERS</u>	Type and Size	Capacity Cu. Ft./Hr.	Connection Size	
American	5B225	225	1 or 1¼	
	AL250	250	1 or 1¼	
	AL425	425	1¼	
	800	800	1½	
Ironcase (American)	5B	165	1 or 1¼	
	10B	250	1 or 1¼	
	20B	350	1¼ or 1½	
	25B	400	1¼	
	30B	550	1½	
	35B	650	1½	
	60B	950	2	
	80B	1250	2 FPT	
	250B	3000	4 FPT	
	500B	4800	4 FPT	
Ironclad	1	150	1	
	2	250	1¼	
	3	300	1½	
	4	500	2	
Sprague	1A	175	1	
	240	240	1	
	2	305	1¼	
	3	400	1¼ or 1½	
	4	675	1½	
	5A	856	2	
Emco	0	175	1 or 1¼	
	1	250	1 or 1¼	
	2	415	1¼ or 1½	
	2½	850	2 FPT	
	3	1250	2 or 3 FPT	
	4	2250	3 or 4 FPT	
	5	5000	4 FPT	
Rockwell	175	175	1 or 1¼	
	250	250	1 or 1¼	
	415	415	1½	
	750	750	1½	
	800 or 1600	800	1½	
Superior	A250	250	1 or 1¼	
<u>TIN METERS</u>	5	150-250	¾	
	10	250-300	¾	
	20	or 400-425		
		250-400	1	
	(B) 30	or 450-600		
450-600		1¼		

(A) All meter bars tapped 1¼" for service and house line.
Consult Gas Company for meters requiring meter bars.

INTRODUCTION

This Manual covering the installation and maintenance of gas service lines, house piping, appliance connections, meters and regulators and appliance venting on customers' premises, and the inspection and testing of the same is published by the Columbia Gas System for two purposes: (1) As a compilation of generally accepted standards in the industry for ready reference and guidance of those persons and firms doing work of the nature described herein, and (2) to describe the inspection and testing of house and service piping which the Company will require before establishing gas service.

These provisions are not intended to be all inclusive, depending upon local conditions and special requirements. Consult your Gas Company in this regard before proceeding with the work. Local laws, ordinances and governmental regulations will, govern such work so far as they are applicable. For further information you are referred to the following:

American Standard Installation of Gas Appliances and Gas Piping — ASA Z21.30 — 1959.

Standards of the National Board of Fire Underwriters for the Installation of Gas Piping and Gas Appliances in Buildings — NBFU No. 54 — 1959.

National Fire Protection Association Standards for the Installation of Gas Piping and Gas Appliances in Buildings — NFPA No. 54 — 1959.

The Gas Company will not assume responsibility for any imperfect material or defective or faulty workmanship in the installation or repair of the customer's service line, house piping, appliances, appliance connections or appliance venting, or for any loss or damage arising from such imperfect material or defective workmanship. The nature and extent of the Gas Company's inspection and testing is set forth hereafter in the section commencing at Page 14, and nothing herein shall operate to enlarge or modify the Gas Company's responsibility for inspection and testing as there set out.

TABLE 1
 MAXIMUM CAPACITY OF PIPE IN CUBIC FEET OF GAS PER HOUR
 (Based upon a Pressure Drop of 0.5 Inch
 Water Column and 0.6 Specific Gravity Gas)

Nominal Iron Pipe Size, Inches	Length in Feet													
	10	20	30	40	50	60	70	80	90	100	125	150	175	200
1¼	1400	950	770	660	580	530	490	460	430	400	360	325	300	280
1½	2100	1460	1180	990	900	810	750	690	650	620	550	500	460	430
2	3950	2750	2200	1900	1680	1520	1400	1300	1220	1150	1020	950	850	800
2½	6300	4350	3520	3000	2650	2400	2250	2050	1950	1850	1650	1500	1370	1280
3	11000	7700	6250	5300	4750	4300	3900	3700	3450	3250	2950	2650	2450	2280
4	23000	15800	12800	10900	9700	8800	8100	7500	7200	6700	6000	5500	5000	4600

TABLE B
 VENT CONNECTOR CAPACITY

Draft Hood Exit Opening Diameter, Inches	Vent Connector Configuration		Maximum Allowable Heat Input To Vent Connector, 1000 Btu per hour	
	Vertical Rise, Feet	Diameter, Inches	Scale 1	Scale 2
3	1	3	21	24
	2		28	30
	3		33	35
4	1	4	32	38
	2		43	46
	3		50	55
5	1	5	39	49
	2		52	56
	3		60	66
6	1	6	67	78
	2		84	92
	3		96	104
7	1	7	92	111
	2		112	129
	3		130	147
8	1	8	100	121
	2		122	140
	3		141	160
9	1	9	132	170
	2		161	191
	3		187	213
10	1	10	140	180
	2		170	202
	3		198	225
12	1	12	200	245
	2		230	275
	3		263	310

SKETCH NO. 28
VENT CAPACITY
MASONRY CHIMNEYS
MULTIPLE APPLIANCE

Notes:

Scale 1, Appliances located in Utility room of single story building.

Scale 2, Appliances located in basement of single story building or basement and/or utility room on first floor of two or more storied building.

TABLE A
COMMON VENT CAPACITY

Chimney Internal Diameter or Equivalent Diameter, Inches	Minimum Total Vent Height, Measured From Draft Hood Exit Opening, Feet						
	6	8	10	15	20	30	50
Maximum Allowable Heat Input, 1,000 Btu per Hour (Combined Appliance Rated Input)							
5	45	52	56	66	74	*	*
6	71	81	89	105	120	135	*
7	102	118	129	150	170	195	*
8	142	162	175	210	240	275	325
10	245	277	300	360	415	490	600
12	*	405	450	540	640	740	910

* Not recommended.

Multiple Appliance Vent Design Tables for Masonry Chimneys

SERVICE LINES

A. OWNERSHIP AND RESPONSIBILITY

1. The Company service line consists of the connection at the main, necessary pipe to extend to the property line or the curb stop location, curb stop, and curb box. This connection is made by the Gas Company, or its representative, without cost to the customer and it remains the property and responsibility of the Gas Company (See Sketch No. 12).
2. The customer service line consists of that part of the service line from the curb stop to the meter setting. The materials, installation and location of the customer service line shall be subject to requirements and specifications contained herein. Such line shall be subject to inspection and test at any time as provided herein, but the Gas Company assumes no responsibility for its condition. The customer shall be responsible for the installation and maintenance of the customer service line at his own expense (See Sketch No. 12).

B. SIZE — CUSTOMER SERVICE LINE

The minimum size customer service line shall be 1¼ inches. The size installed for low pressure service should permit the delivery of the estimated maximum hourly rate with ½ inches water column pressure drop or less between the main and the meter location (See Table 1). For larger sizes consult the Gas Company.

C. MATERIALS

1. Standard weight or extra heavy black steel line or wrought iron pipe shall be used for all service lines. This pipe shall comply with the American Standard for Wrought-Steel and Wrought-Iron Pipe, ASA B36.10-1959. Galvanized pipe is not permitted.
2. All screw fittings are to be black, malleable iron of standard weight. Bushings, all thread nipples, cast iron fittings, and galvanized fittings are not permitted in the service line. Unions shall not be permitted in the customer

service line except where they may be required above ground in the meter or regulator setting.

3. Where more than one length of pipe is required, welding or an approved compression coupling of the bolt or boltless type with conducting gasket and minimum barrel length of four inches shall be used to join the lengths of service pipe. Welding procedures and quality of welding shall conform to the procedures and processes in ASA B31.8-1958 Code for pressure piping systems intended to operate at less than 20% of the specified minimum yield strength.

D. INSTALLATION

1. As soon as, or before the foundation of a structure is started, the customer, owner, or his representative, shall contact the local office of the Gas Company for information as to size, location, and termination points of the customer service line.
2. The customer service line shall be laid on undisturbed or well compacted soil in a separate trench, avoiding sewers, water pipes, and conduits, and shall not run through septic tanks or leaching beds. It shall not be laid on a bench or offset of a deeper trench. The trench shall be graded uniformly to provide solid and continuous foundation for the pipe and shall be deep enough to provide at least 12 inches of cover over the service pipe. Where it is necessary for electrical or telephone conduits or water pipe to pass over or under a gas pipe underground, there shall be a clearance of at least six inches between such conduits or pipe and the gas pipe.
3. The customer service line shall enter the foundation above grade where practicable. Where the customer service line enters a masonry foundation above or below grade, it shall enter through a sealed sleeve. Where the customer service line enters the foundation below grade, a full joint of pipe (if the service is that long) shall extend through the wall from a point

TABLE B
VENT CONNECTOR CAPACITY

Draft Hood Exit Opening Diameter, Inches	Vent Connector Configuration		Maximum Allowable Heat Input To Vent Connector, 1000 Btu per hour	
	Vertical Rise, Feet	Diameter, Inches	Scale 1	Scale 2
3	1	3	22	25
	2		29	31
	3		34	36
	1	4	34	40
	2		44	48
	3		51	57
4	1	4	42	49
	2		53	58
	3		61	68
	1	5	63	74
	2		77	86
	3		87	95
5	1	5	71	83
	2		87	97
	3		98	106
	1	6	97	118
	2		117	132
	3		136	149
6	1	6	106	128
	2		127	144
	3		148	162
	1	7	145	176
	2		172	198
	3		193	219
7	1	7	153	186
	2		182	210
	3		205	232
8	1	8	212	265
	2		242	289
	3		274	320

SKETCH NO. 27
VENT CAPACITY
SINGLE WALL METAL OR
ASBESTOS CEMENT PIPE
MULTIPLE APPLIANCE

Notes:

Scale 1, Appliances located in utility room of single story building.

Scale 2, Appliances located in basement of single story building or basement and/or utility room on first floor of two or more storied building.

TABLE A
COMMON VENT CAPACITY

Common Vent Diameter, Inches,	Minimum Total Vent Height, Measured From Draft Hood Exit Opening, Feet						
	6	8	10	15	20	30	50
Maximum Allowable Heat Input, 1,000 Btu per Hour (Combined Appliance Rated Input)							
4	48	55	59	71	80	*	*
5	78	89	95	115	129	147	*
6	111	128	136	168	186	215	*
7	155	175	190	228	260	300	360
8	205	234	250	305	340	400	490
10	320	365	395	480	550	650	810
12	*	505	560	690	790	940	1190

* Not recommended.

Multiple Appliance Vent Design Tables for Single Wall Metal or Asbestos Cement Vent Pipe

inside of the foundation. The opening between the sleeve and the foundation shall be filled with grout, or sealed by the use of a service entry flange (See Sketch No. 5).

4. Where possible, the customer service line from the curb box to the meter or first regulator above ground shall be installed in a continuous straight line with the Company service line. Where vertical offsets are required, only turns consisting of 90 degree ells will be permitted. Bends in pipe are not permitted (See Sketch No. 4).
5. Where conditions indicate the necessity of laying the customer service line under an unexcavated portion of a building, in order to reach the meter setting location, the Gas Company must be consulted. There may be conditions under which the installation will be permitted. In case permission is given, the customer service line shall be cased from a point approximately two feet upstream of the foundation entry to a point on the riser approximately six inches above the floor. The ends of the casing shall be sealed to the customer service line by welding or the use of a compression seal. A vent line shall be provided from the casing outside of the building to a point where no hazard will exist (See Sketch No. 7).
6. It is permissible for the customer service line to enter the sidewall or foundation of the building. The line should parallel the foundation wall at a distance of not less than three feet from the foundation, to a point opposite the meter setting location. Such a line carrying gas which is as yet unmetered, shall not parallel the foundation or building wall for a distance of more than 15 feet. Where these conditions cannot be met, the meter shall be installed on the outside of the building and located so as to comply with above conditions. The Gas Company must be consulted if any alternate location other than specified above is desired.
7. The customer service line shall not be laid under concrete or other hard surface walks or

driveways except where it may be necessary to cross under such walks or driveways. Where walks, in excess of eight feet in width, or driveways extend from curb to foundation wall or the full width of the property, such as service stations and places of business, a vent shall be installed at the customer's expense over the line near the foundation wall (See Sketch No. 8).

8. Each length of pipe should be examined before installation, and any dirt or obstruction should be removed. Any burrs left by the cutting tool should be reamed off. Pipe and fittings should be examined for condition of threads. Pipe dope or thread lubricant should be used sparingly and on male threads only.

9. Customer service lines that incorporate a regulator shall have a tee included in the inlet riser (See Sketch No. 6). The side opening of the tee shall be plugged, and the head of the plug used to close this opening shall be drilled for a wire and lead seal.

10. The customer service line trench shall not be backfilled until after the line has been inspected by a representative of the Gas Company.

11. No heavy equipment shall be run over the customer service line or trench immediately after it has been backfilled. The material used for the backfill in contact with the pipe shall be free of rocks, building materials, etc., that might cause damage to the pipe or protective coating. Cinders and slag should not be used in the backfill except where it is unavoidable, in which case the customer service line shall be coated or coated and wrapped, and given whatever cathodic protection considered necessary.

**E. GENERAL REQUIREMENTS
GOVERNING SERVICE LINES**

1. Each building served with gas shall have a separate customer service line, except that a separate line will not be laid for gas service

**TABLE B
VENT CONNECTOR CAPACITY**

Draft Hood Exit Opening Diameter, Inches	Vent Connector Configuration		Maximum Allowable Heat Input To Vent Connector, 1000 Btu per hour	
	Vertical Rise, Feet	Diameter, Inches	Scale 1	Scale 2
3	1	3	23	26
	2		30	32
	3		35	37
	1	4	36	43
	2		46	50
	3		53	57
4	1	4	45	52
	2		56	61
	3		64	69
	1	5	66	79
	2		81	90
	3		91	98
5	1	5	76	88
	2		91	101
	3		102	110
	1	6	106	125
	2		128	142
	3		145	157
6	1	6	115	136
	2		139	155
	3		158	171
	1	7	156	189
	2		184	213
	3		208	234
7	1	7	165	200
	2		195	226
	3		220	248
8	1	8	230	282
	2		260	310
	3		295	345

SKETCH NO. 26
VENT CAPACITY
DOUBLE WALL METAL PIPE
MULTIPLE APPLIANCE

Notes:

Scale 1, Appliances located in utility room of single story building

Scale 2, Appliances located in basement of single story building and/or utility room of two or more storied building.

TABLE A
COMMON VENT CAPACITY

Common Vent Diameter, Inches	Minimum Total Vent Height, Measured From Draft Hood Exit Opening, Feet						
	6	8	10	15	20	30	50
Maximum Allowable Heat Input, 1,000 Btu per Hour (Combined Appliance Rated Input)							
4	52	60	65	76	86	97	*
5	84	95	104	122	140	158	185
6	120	136	151	178	204	237	275
7	165	190	207	246	284	328	395
8	220	250	272	325	380	442	550
10	345	395	440	520	605	705	890
12	*	570	640	760	890	1060	1320

* Not recommended.

Multiple Appliance Vent Design Tables for Double Wall Metal Vent Pipe

to a garage, work shop, or other building on a lot where there already exists a service line to the residence or main building of the customer.

2. For single family dwellings, and for doubles, duplexes, apartments, terraces or flats having a basement common to all tenants, only one customer service line is required, and meters shall be manifolded at one location (See Sketch No. 12). Where doubles, duplexes, apartments, terraces or flats have a divided basement, customer service lines shall be so installed as to provide an external shut-off for each division of the building (See Sketch No. 12).
3. Where the gas main is located in the alley, the curb stop and box shall be located adjacent to the rear property line. Where the gas main is located in the roadway or between the curb and property line, the curb stop and box shall be located adjacent to the front property line (See Sketch No. 12).

METERS AND SERVICE PRESSURE REGULATORS

A. GENERAL

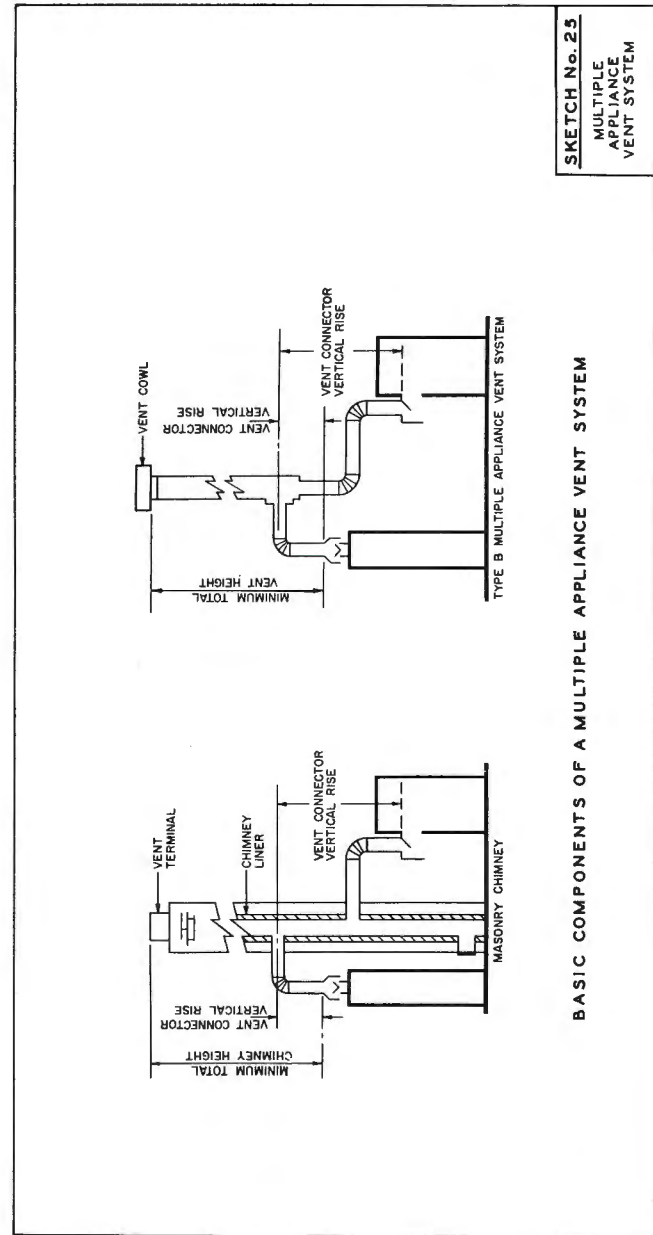
1. The Gas Company will furnish and connect a meter for each customer, and this meter shall remain the property of the Gas Company.
2. When service is provided from distribution mains at pressure in excess of one psig, the Company will furnish the necessary pressure regulators, and these pressure regulators shall remain the property of the Gas Company.
3. A suitable vent, terminating in an insect and rain-proof fitting, shall be provided for all service pressure regulators.
4. Service pressure regulators when incorporating a relief device and installed inside shall be vented to the outside using $\frac{3}{4}$ inch pipe or one inch metal tubing.
5. Service pressure regulators that do not incorporate a relief device and are installed inside

shall be vented to the outside using $\frac{1}{4}$ inch pipe or $\frac{3}{8}$ inch metal tubing.

- Where necessary to make piping alterations, a gas fitter or plumber may remove the meter by first closing the meter stop then disconnecting both the inlet and outlet of the meter and notifying the Gas Company of its removal. Persons not in the employ of the Gas Company are forbidden to reconnect either the inlet or the outlet of the meter. The meter stop shall be left shut off and the service line outlet shall be plugged. The Gas Company shall be notified to reconnect the meter and turn on the gas after the alterations have been made and tested.

B. LOCATION

- The Gas Company reserves the right to determine meter location.
- Gas meters shall be installed as near as practicable to the point where the service enters the building and shall be so located as to be readily accessible for examination, reading, and replacement.
- All piping from the point where the service line enters the building to the meter shall be exposed and accessible.
All service piping making up the setting for an outside manifold meter setting shall be located above ground.
- The gas meter shall not be installed in a small, unventilated, or confined space.
- A gas meter shall not be placed where it will be subjected to damage, such as in driveways, public passages, halls, coal bins, etc., or where it will be subjected to excessive corrosion.
- Gas meters shall be located at a minimum of three feet from any electric panel or meter, and a minimum of five feet from a furnace or incinerator or its vent connector. It is desirable to avoid extreme temperatures and sudden changes in temperature.
- Service regulators supplied from medium or



SKETCH NO. 24 • EQUIVALENT SIZES • RECTANGULAR & ROUND DUCTS

Diameters in Inches of Round Ducts That Have the Same Friction and Capacity as Various Sizes of Rectangular Ducts

	One Side of Rectangular Duct, Inches													
	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7.0	8.0	9.0	10.0	11.0		
5.0			4.9	5.2	5.5									
5.5		4.8	5.1	5.4	5.7	6.0								
6.0		5.0	5.3	5.6	6.0	6.3	6.6							
7.0	4.9	5.3	5.7	6.1	6.4	6.8	7.1	7.7						
8.0	5.2	5.7	6.1	6.5	6.9	7.2	7.5	8.2	8.8					
9.0		5.8	6.4	6.9	7.3	7.6	8.0	8.6	9.3	9.9				
10.0				7.2	7.6	8.0	8.4	9.1	9.8	10.4	10.9			
11.0					8.0	8.4	8.8	9.5	10.2	10.8	11.4	12.0		
12.0					8.3	8.7	9.1	9.9	10.7	11.3	11.9	12.5		
13.0						9.0	9.5	10.3	11.1	11.8	12.4	13.0		
14.0							9.8	10.7	11.5	12.2	12.9	13.5		
15.0								11.0	11.8	12.6	13.3	14.0		
16.0									12.2	13.0	13.7	14.4		

One Side of Rectangular Duct, Inches

high pressure mains shall be installed outside of the building where practicable.

C. INSTALLATION

1. When the meter stop is smaller than two inches, an approved tamper-proof stop (a stop designed and constructed to minimize the possibility of the removal of the core of the stop accidentally or willfully) shall be installed in the service line at the customer's expense, upstream of the meter and/or regulator inlet. All meter stops 2" and over shall be of the lubricated type, or equivalent. For pressures in excess of 50 psi, all meter stops shall be of the lubricated type or equivalent.
2. Where six or more meters are manifolded at one location, a master stop controlling the gas supply to all meters must be provided, in addition to the stops controlling the supply to each meter. Where a regulator supplies two or more meter settings, there shall be a master stop controlling the gas supply on the inlet side of the regulator in addition to the stops controlling the gas supply to each meter.
3. On multiple meter installations each meter stop shall be plainly marked by a metal tag installed by the gas fitter or plumber, designating the part of the building being supplied.
4. For certain types and sizes of meters the Gas Company will furnish a meter bar to which the meter is to be attached. See "Meter Specifications", Pages 60-61.
5. Distance between meter and any wall shall be approximately six inches. On outside meter settings the bottom of the meter shall be approximately six inches above finished grade.
6. Meter settings must be plumb and level so that the meter will line up properly with the meter connections. Where the customer service line terminates in an outside meter setting, setting shall have a firm substantial support under the swing joint at riser (See Sketch No. 6).
7. Typical meter setting installations are illustrated in Sketch Nos. 6, 9, 10, and 11.

8. See "Meter Specifications", for type, size, and dimensions of meters most commonly used, Pages 60-61.

D. RURAL OR HIGH PRESSURE DOMESTIC REGULATOR SETTING

When service is provided from a transmission, field or other high pressure distribution lines not part of the distribution system from which customers are normally supplied, the customer shall, at his expense, provide regulation as required by the Gas Company, for reducing the pressure to the standard distribution pressure at the outlet of the regulator setting.

The regulators shall be installed, at the customer's expense, in accordance with Gas Company plans, immediately adjacent to the Company's high pressure line. Where required, the customer shall provide suitable housing for the regulators and the meter, as protection for this equipment from the weather and acts of irresponsible parties.

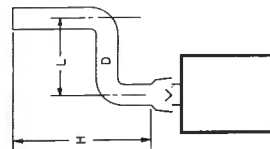
HOUSE PIPING

The customer, at his own expense, shall install the house piping from the outlet of the meter to gas burning appliances. House piping shall consist of all piping from the outlet of the meter to the appliance connectors.

Where house lines are buried, the requirements and specifications covering customer service lines shall apply, unless a specific exception is stated in this section of the Manual.

A. MATERIALS

- Gas piping in buildings shall be steel pipe complying with the American Standard for Wrought-Steel and Wrought-Iron Pipe, ASA B36.10-1959. Copper tubing may be used for installation of gas lights.
- All pipe fittings (Except stops and valves) shall be malleable iron.



Single Wall or Asbestos
Cement Vent Pipe Design
Tables for Single Appliances

	0	2	5	10	15	20		0	2	5	10	15	20	30
20	53*	42*	38*	32*	NR	NR	101	163	252	342	470	770	1190	1190
	0	2	5	10	15	20	56*	183	276	384	529	878	1370	1370
30	44*	NR	NR	NR	NR	NR	84*	148*	230	320	441	730	1140	1140
	0	2	5	10	15	20	78*	137*	210	296	410	694	1080	1080
50	NR	NR	NR	NR	NR	NR	68*	125*	196*	274	388	656	1050	1050
	0	2	5	10	15	20	NR	113*	177*	258*	366	625	1000	1000
	0	2	5	10	15	20	NR	99*	163*	240*	344	596	960	960
	0	2	5	10	15	20	NR	NR	NR	192*	295*	540	890	890
	0	2	5	10	15	20	120*	310*	443*	590	980	1550	1550	1550
	0	2	5	10	15	20	95*	171*	260*	370*	492	820	1290	1290
	0	2	5	10	15	20	NR	159*	234*	342*	474	780	1230	1230
	0	2	5	10	15	20	NR	146*	221*	318*	456*	730	1190	1190
	0	2	5	10	15	20	NR	NR	200*	292*	407*	705	1130	1130
	0	2	5	10	15	20	NR	NR	185*	276*	384*	670*	1080	1080
	0	2	5	10	15	20	NR	NR	NR	222*	330*	605*	1010	1010

SKETCH NO. 23
VENT PIPE DESIGN
SINGLE WALL OR ASBESTOS
CEMENT VENT PIPE

NR — Not Recommended.
Numbers followed by
asterisk — possibility of con-
tinuous condensation de-
pending on locality. Consult
local utility and/or local
codes.

NOTE:
Prior to application of these
tables, the list of additional
factors to be considered in
single appliance vent design
(Tables 3 and 4) should be
reviewed.

Total Height, Feet, H	Total Lateral Length, feet L	MAXIMUM ALLOWABLE HEAT INPUT (Appliance Rated Heat Input Thousands of Btu Per Hour)											Total Lateral Length, feet L
		VENT DIAMETER D, INCHES											
		3	4	5	6	7	8	10	12				
6	0	39	70	116	170	232	312	500	750	0			
	2	31	55	94	141	194	260	415	620	2			
	5	28	51	88	128	177	242	390	600	5			
8	0	42	76	126	185	252	340	542	815	0			
	2	32	61	102	154	210	284	451	680	2			
	5	29	56	95	141	194	264	430	648	5			
10	0	24*	49	86	131	180	250	406	625	10			
	2	45	84	138	202	279	372	606	912	0			
	5	35	67	111	168	233	311	505	760	2			
15	0	27*	54	94	143	200	274	455	700	5			
	2	NR	46*	84	130	186	258	432	666	10			
	5	49	91	151	223	312	420	684	1040	15			
15	0	49	91	151	223	312	420	684	1040	0			
	2	39	72	122	186	260	350	570	865	2			
	5	35*	67	110	170	240	325	540	825	5			
15	0	30*	58*	103	158	233	308	514	795	10			
	2	NR	50*	93*	144	207	291	488	760	15			
	5	NR	NR	82*	132*	195	273	466	726	20			

- Running threads, right and left couplings, bushings, cast iron fittings, solder type fittings or connections shall not be used.
- When unions are used they shall be of the ground joint type.
- Only hard seat valves shall be used and all valves requiring packing shall be packed with asbestos material.

B. INSTALLATION

- All gas piping shall be installed with the gas turned off to eliminate hazards from leakage of gas.
- Where there are long buried house lines, long screw couplings (extra heavy malleable iron) may be used to join lengths of pipe that are located at least 100 feet from the structure served.
- Gas piping and fittings shall be clear and free from cutting burrs and defects in structure or threading. Pipe dope or thread lubricant is to be used sparingly and on male threads only.
- All pipe shall be securely supported by means of straps or hooks of permanent material to ceilings and walls and all strains on piping eliminated.

The following recommendations are given for spacing of supports in piping installations:

Pipe Size Inches	Support Spacing Feet
1/2	6
3/4 or 1	8
1 1/4 or larger (Horizontal)	10

- Gas piping shall not be laid in a concrete floor unless properly cased or channeled.
- Piping inside any building shall not be run in or through an air duct, clothes chute, chimney or flue, ventilating duct, dumb waiter or elevator shaft.
- When installing piping which will be concealed (in partitions) the number of fittings shall be

kept to a minimum. Unions and swing joints made of combinations of fittings shall not be used.

8. Welding procedures and quality of welding shall conform to the procedures and processes in ASA B31.8-1958 Code for Pressure Piping for welds on piping systems intended to operate at less than 20% of the specified minimum yield strength.

9. Gas appliance shall be connected to the gas piping with rigid pipe, listed metal appliance connectors or approved semi-rigid tubing in lengths not greater than six feet. When approved by the Gas Company, approved semi-rigid tubing may be used in greater lengths. When an appliance connector or tubing is used, it shall connect to an outlet in the same room as the appliance. The connector or tubing shall be installed so as to be protected against physical injury.

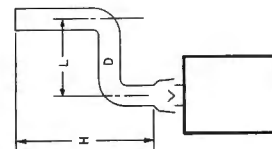
Aluminum alloy tubing and connectors shall not be used in exterior locations nor in interior locations where they are in contact with masonry or plaster walls or insulation.

10. All piping shall be installed and project far enough from walls and floors to permit the use of a pipe wrench of suitable size without straining or bending the pipe. All unused piping outlets are to be securely capped or plugged.

11. When gas equipment is to be installed which employs other gases, air or fluids at higher than normal gas pressures, a suitable check valve is required. The Gas Company shall be consulted for details.

12. Gas piping used to connect house piping to an appliance shall not be less in size than the size or connection at the appliance.

13. The minimum sizes of house and apartment piping permitted to the drop line or connection for heating equipment and/or various types of appliances are shown in Table 2.



Double Wall Metal Vent
Pipe Design Tables for Single
Appliances

20	0	1370	900	555	412	295	202	122	67	0	20
	2	1140	750	455	343	246	168	99	54	2	
	5	1125	740	436	328	232	159	95	50	5	
	10	1090	705	418	312	221	148	87	44	10	
	15	1050	678	406	297	210	132	78	39	15	
	20	1030	660	387	284	194	126	68	22*	20	
30	0	1570	1030	624	456	326	218	131	69	0	30
	2	1310	860	520	380	272	181	106	57	2	
	5	1290	848	500	363	257	171	101	53	5	
	10	1250	808	478	346	244	159	92	46*	10	
	15	1210	778	464	329	232	142	84	39*	15	
	20	1180	756	442	315	214	136	73*	23*	20	
	30	1110	705	400	276	185	107	NR	NR	30	
50	0	1750	1140	702	516	364	246	146	79*	0	50
	2	1460	955	585	430	303	205	118	63*	2	
	5	1440	942	561	411	296	194	115*	60*	5	
	10	1400	895	538	391	272	180	103*	52*	10	
	15	1350	865	521	372	259	161	94*	44*	15	
	20	1310	841	496	356	239	154*	82*	NR	20	
		30	1240	783	450	313	206*	121*	NR	NR	

SKETCH NO. 22
VENT CAPACITY
DOUBLE WALL METAL PIPE

NR — Not Recommended.
Numbers followed by
asterisk — possibility of con-
tinuous condensation de-
pending on locality. Consult
local utility and/or local
codes.

Total Height, feet H	Total Lateral Length, Feet L	MAXIMUM ALLOWABLE HEAT INPUT (Appliance Rated Heat Input Thousands of Btu Per Hour)											Total Lateral Length, Feet
		VENT DIAMETER D, INCHES											
		3	4	5	6	7	8	10	12				
6	0	45	81	182	192	260	344	540	790	0			
	2	36	66	110	160	216	287	450	660	2			
	5	34	63	104	151	208	275	442	650	5			
8	0	50	91	149	216	297	396	610	920	0			
	2	40	74	124	180	247	330	510	770	2			
	5	38	71	117	170	236	317	504	760	5			
	10	33	65	109	162	225	303	480	732	10			
10	0	54	100	161	236	324	432	695	1030	0			
	2	43	80	134	196	270	360	580	859	2			
	5	41	77	127	185	258	346	572	846	5			
	10	35	71	118	176	246	331	545	816	10			
	15	31	64	105	167	234	321	534	792	15			
15	0	60	110	180	266	362	500	800	1220	0			
	2	49	89	150	222	302	416	665	1020	2			
	5	45	85	142	210	289	400	655	1010	5			
	10	39	78	132	200	274	382	625	970	10			
	15	34	71	118	190	261	371	602	940	15			
	20	20*	61	113	175	250	354	585	920	20			

TABLE 2

MINIMUM HOUSE PIPING SIZES PERMITTED
FOR SINGLE HOUSES AND/OR APARTMENT
HOUSES, EACH UNIT METERED SEPARATELY

Single Houses and/or Apartment Houses	Minimum Size
a. Meter to first outlet	1¼"
b. Outlet of meter to drop line of central heating equipment (80,000 Btu input or greater)	1¼"
c. Outlet of meter to drop line of central heating equipment (Less than 80,000 Btu)	1"
d. To instantaneous water heater	1"
e. To kitchen range	¾"
f. To storage type water heater	¾"
g. Main supply line to second floor	¾"
h. To each heating stove (20,000 Btu input or less)	½"
i. To refrigerator	½"
j. To clothes dryer	½"
k. To hot plate	½"
l. Incinerator	½"
m. Gas Light	¼"
14. For larger piping installations such as large single dwellings, double houses, apartment houses, commercial buildings, churches and schools; the Gas Company should be consulted on the selection of adequate piping.	
15. In remodeling or extending existing piping, connections must be made so that sizes can be maintained in accordance with these require- ments and specifications. Where sizes cannot be maintained from old house piping, appli- ances shall be supplied by a separate line of pipe from the meter.	
16. A valve or stop should be installed ahead of each gas burning appliance and must be when required by local ordinance. The valve or stop shall be placed in an accessible position.	

INSPECTION AND TESTING

Customer service line and house piping shall be inspected and tested as follows:

A. NEW CONSTRUCTION

1. The owner, plumber or owner's representative shall give the Gas Company notice that work is completed and ready for testing. This notice must be made to the Gas Company at least 24 hours in advance of the time when desired.
2. Customer service line and house piping shall be tested after construction and before being placed in service to demonstrate that it does not leak. In no case shall oxygen, acetylene, or ether with air be used in testing lines. In addition, the service line shall be visually inspected by the Gas Company before the trench is filled.

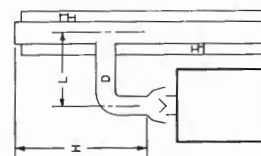
Service line and house piping to operate at less than 1 psig will be subjected to an air pressure test of not less than six inches of mercury column (3 psig) and no discernible loss in pressure drop must be shown over a period of not less than ten minutes. (See Notes a and b.)

Service lines to operate at a pressure of 1 psig to 50 psig shall be given an air or gas pressure test of not less than 50 psig for at least five minutes. (See Note b.)

Service lines to operate at pressures in excess of 50 psig shall be tested to the maximum operating pressure or 100 psig, whichever is the lesser for at least five minutes. (See Note b.)

Notes

- a. On house piping this test will be made with manual shut-off valves to the appliances closed, or if there is no shut-off valve the appliance shall be disconnected and the line capped.
- b. For a service line larger than two inches, consult the Gas Company for testing procedures.



Masonry Chimneys With Single Wall Pipe Vent Connector Design Tables For Single Appliances

20	2	38*	73	123	200	273	374	625	950	2
	5	35*	67*	115	183	252	348	594	930	5
	10	NR	59*	105*	170	235	330	562	875	10
	15	NR	NR	95*	156	217	311	536	835	15
	20	NR	NR	80*	144*	202	292	510	800	20
30	2	41*	81*	136	215	302	420	715	1110	2
	5	NR	75*	127*	196	279	391	680	1090	5
	10	NR	66*	113*	182*	260	370	644	1020	10
	15	NR	NR	105*	168*	240*	349	615	975	15
	20	NR	NR	88*	155*	223*	327	585	932	20
50	2	NR	91*	160*	250	350*	475	810	1240	2
	5	NR	NR	149*	228*	321*	442	770	1220	5
	10	NR	NR	136*	212*	301*	420*	728	1140	10
	15	NR	NR	124*	195*	278*	395*	695	1090	15
	20	NR	NR	NR	180*	258*	370*	660*	1040	20
30	NR	NR	NR	NR	NR	NR	318*	610*	30	

SKETCH NO. 21
VENT CAPACITY
MASONRY CHIMNEY

NR — Not Recommended.
Numbers followed by
asterisk — possibility of con-
tinuous condensation de-
pending on locality. Consult
local utility and/or local
codes.

Total Height, Feet H	Vent Connector Horizontal Length, Feet L	MAXIMUM ALLOWABLE HEAT INPUT (Appliance Rated Heat Input Thousands of Btu Per Hour)										Vent Connector Length, Feet L
		VENT CONNECTOR DIAMETER, D, INCHES										
		3	4	5	6	7	8	10	12			
6	2	28	52	86	130	180	247	400	580	2		
	5	25*	48	81	118	164	230	375	560	5		
8	2	29	55	93	145	197	265	445	650	2		
	5	26*	51	87	133	182	246	422	638	5		
10	2	22*	44*	79	123	169	233	400	598	10		
	5	31	61	102	161	220	297	490	722	2		
15	2	28*	56	95	147	203	276	465	710	5		
	5	24*	49*	86	137	189	261	441	665	10		
15	10	NR	42*	79*	125	175	246	421	634	15		
	15	35*	67	113	178	249	335	560	840	2		
20	2	32*	61	106	163	230	312	531	825	5		
	5	27*	54*	96	151	214	294	504	774	10		
20	10	NR	46*	87*	138	198	278	481	738	15		
	20	NR	NR	73*	128*	184	261	459	706	20		

- The first inspection and test of any job shall be without charge. In the event the lines will not pass such inspection and test, or if other unsatisfactory conditions result in the disapproval by the Gas Company, the necessary correction shall be made at the owner's expense and the lines involved shall again be tested subject to a charge for such additional test.
- At the time the service line and house piping are tested, the results of such tests will be recorded by the Gas Company representative on an appropriate form. If the service line and/or house piping do not pass the tests prescribed in Paragraph A.2. above, the owner, plumber, or owner's representative will be notified.
- Gas Service will be established only by a representative of the Gas Company after the piping satisfactorily passes the foregoing tests.

B. REPAIRED, REMODELED, OR EXTENDED CONSTRUCTION

- Where the existing house piping is repaired, remodeled, or extended, the owner, plumber or owner's representative may notify the Gas Company to make an inspection of the piping. Based on the extent of the piping changes, the Gas Company's representative will make one of the following tests.
 - The test outlined under Section A, Item 2, above.
 - A pressure drop test conducted at a pressure approximately equivalent to the normal operating gas pressure, but not less than ten inches water column for not less than one minute with no discernible pressure drop.

In addition, if the service line is repaired, remodeled, or extended, the exposed portions, thereof, shall be visually inspected by

the Gas Company before the excavation is filled.

2. In the event the lines will not pass such inspection and test, or if other unsatisfactory conditions result in the disapproval by the Gas Company, the necessary correction shall be made at the owner's expense and the lines involved shall again be inspected and tested subject to a charge for such additional inspection and test.

The Company does not assume responsibility for inspecting or testing customer's piping other than as set out in this section.

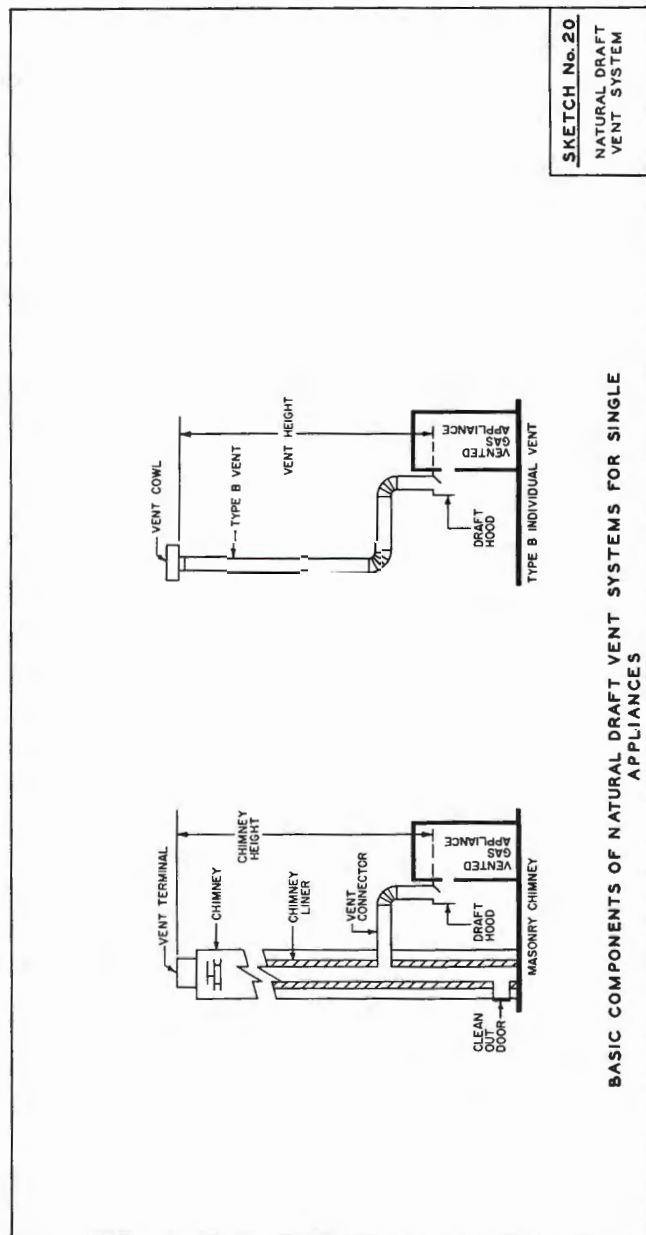
APPLIANCE VENTING

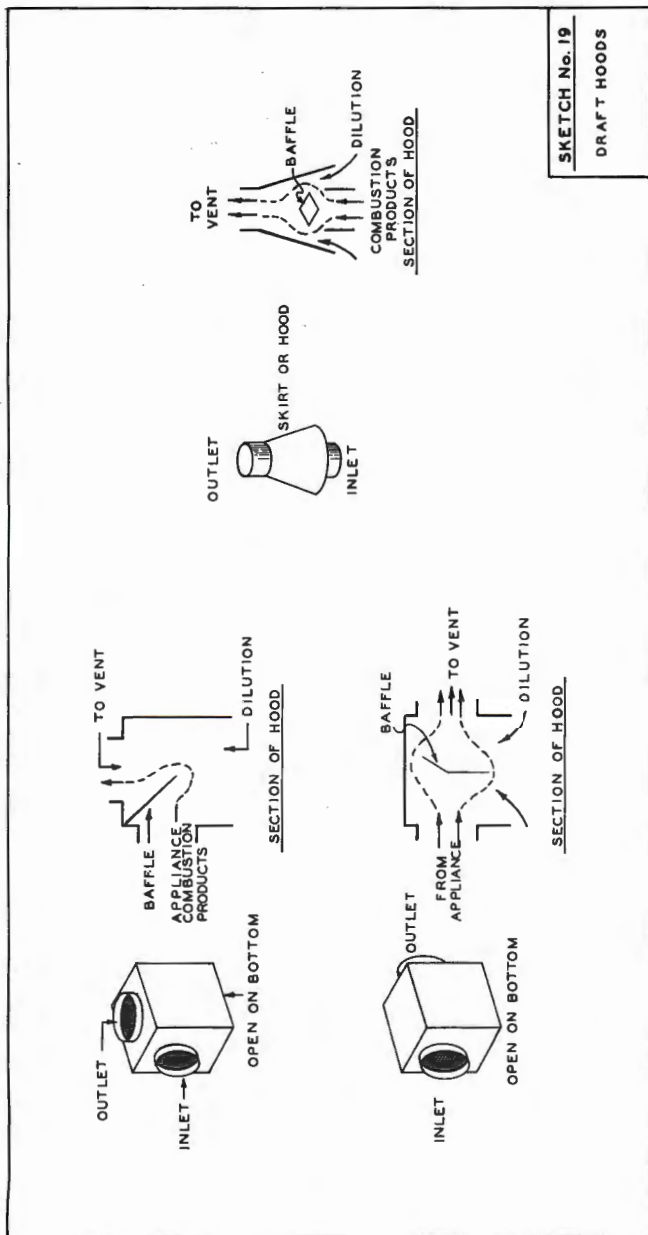
The policies described in this section are published in the interest of disseminating information as to the proper venting of gas burning appliances to provide for their safe and economical operation. By the publication of this Manual, the Gas Company does not assume any responsibility for inspecting and testing the venting of gas appliances.

A. APPLIANCES REQUIRING VENTS TO OUTSIDE ATMOSPHERE

The following appliances **must** be vent-connected or provided with other means for removing the flue gases directly to the outside atmosphere.

1. Automatically controlled appliances which use more than 5,000 Btu per hour, except the following:
 - a. Built-in domestic cooking units listed and marked as unvented units
 - b. Listed ranges
 - c. Domestic gas clothes dryers
 - d. Gas refrigerators
 - e. Gas hot plates
 - f. Counter appliances
 - g. Gas dishwashers
2. All central heating, steam and hot water boilers, warm air furnaces, floor furnaces, unit heaters, duct furnaces and recessed heaters.





3. Conversion burners in coal or oil furnaces or boilers.
4. Circulating heaters having provision for a vent.
5. Room heaters in sleeping quarters.
6. Room heaters installed in sleeping quarters for use of transients, as in hotels, motels and auto courts, shall be connected to an effective vent and equipped with an automatic safety pilot.
7. Room heaters installed at any location in institutions such as Homes for the Aged, Sanitariums, Convalescent Homes, Orphanages, etc., shall be connected to an effective vent and equipped with an automatic safety pilot.
8. Every water heater having a gas input of 5,000 Btu per hour or more must be vented. Water heaters shall not be installed in bathrooms, bedrooms or any occupied rooms normally kept closed.
9. Gas fired incinerators. (Require Type A vent.)

B. PROPER VENTING FOR A GAS APPLIANCE

1. *Appliances must be vented to a bonafide chimney flue of brick, tile, transite, or metal. Transite or metal vents are only effective when they run in the interior of the building.

Prefabricated types of gas vents are defined as follows:

- a. Type B Gas Vents: Factory-made gas vents listed by a nationally recognized testing agency for venting listed or approved appliances equipped to burn only gas.
- b. Type B-W Gas Vents: Factory-made gas vents listed by a nationally recognized testing agency for venting listed or approved gas-fired vented recessed heaters.
- c. Type C Gas Vents: Vents constructed of sheet copper not less than No. 24 U. S.

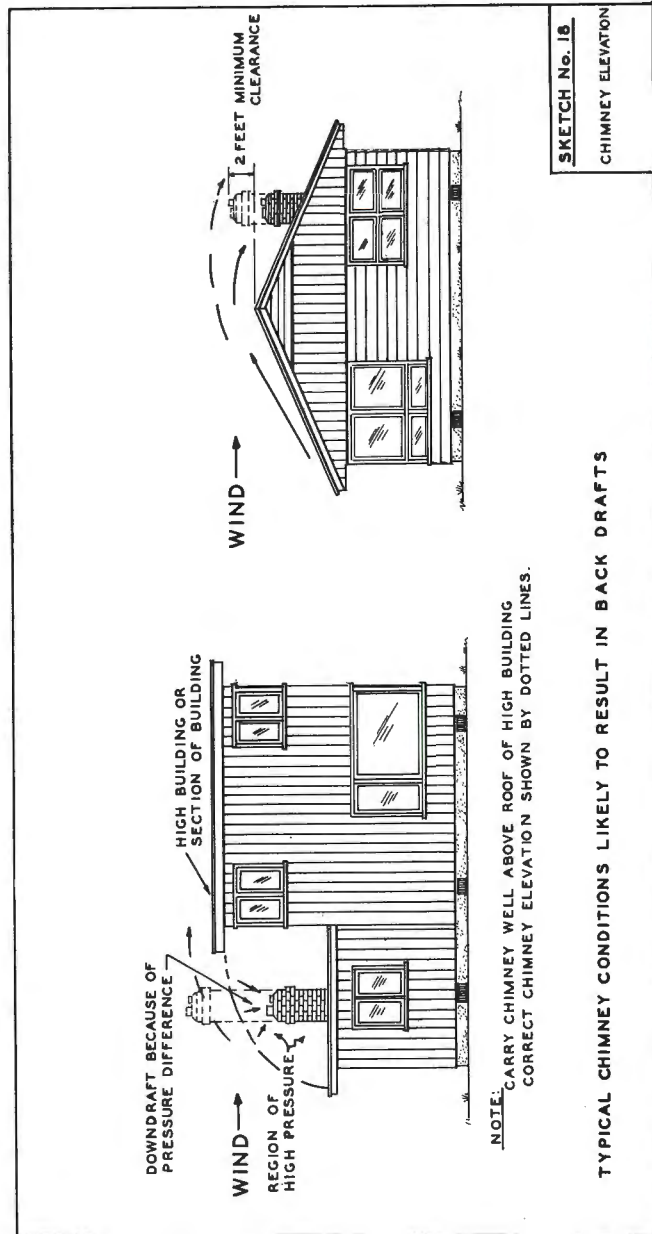
*These specifications shall not apply to the installation of appliances approved under ASA requirements for equipment having a sealed combustion chamber and direct air supply for complete combustion from the outside and direct discharge of all products of combustion to the outside, in which the vent is an integral part of such equipment.

Standard gage or galvanized iron of not less than No. 20 U. S. Standard gage or other approved non-combustible corrosion-resistant material.

When a patented vent of the double wall type (Type B) is used, it is permissible to follow the manufacturer's or local ordinance recommendations for installation (See Sketch No. 20).

2. Gas vents shall extend at least two feet above the highest point where they pass through a roof of a building and at least two feet higher than any portion of a building within ten feet, except that gas vents need not comply with this provision when equipped with an approved device and proper and effective venting is accomplished. Chimneys shall extend at least three feet above the highest point where they pass through the roof of a building and at least two feet higher than any portion of the building within ten feet (See Sketch No. 18).
3. Vents must not discharge into attics, under porches or into similar spaces.
4. *Vents shall be constructed or installed in such a way as not to become a fire hazard. Where vent connectors pass through partitions of combustible construction, ventilated thimbles shall be used. Horizontal runs shall be supported at intervals of not over six feet.
5. Gas appliances shall not be vented to a fireplace flue unless the fireplace and other openings into the flue above are effectively sealed.
6. The vent connector shall maintain a continuous pitch or rise from the appliance to the flue or vent. A rise of at least $\frac{1}{4}$ inch to the foot (horizontal length) should be maintained.
7. The horizontal run of the connector should be as short as possible and the appliance located

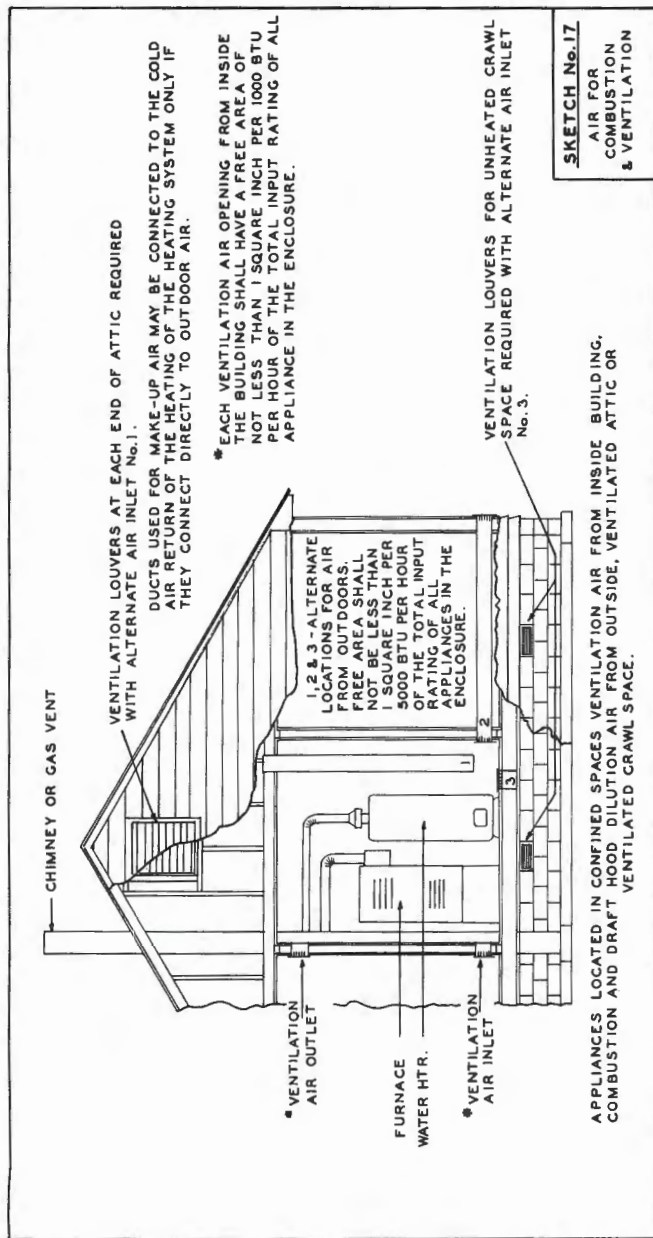
*These specifications shall not apply to the installation of appliances approved under ASA requirements for equipment having a sealed combustion chamber and direct air supply for complete combustion from the outside and direct discharge of all products of combustion to the outside, in which the vent is an integral part of such equipment.



NOTE: CARRY CHIMNEY WELL ABOVE ROOF OF HIGH BUILDING
CORRECT CHIMNEY ELEVATION SHOWN BY DOTTED LINES.

SKETCH No. 18
CHIMNEY ELEVATION

TYPICAL CHIMNEY CONDITIONS LIKELY TO RESULT IN BACK DRAFTS



8. Manually operated dampers shall not be placed in any part of the vent system. Fixed baffles between the draft hoods and the appliance are not classified as dampers.
9. The vent connector shall not be smaller than the size of the vent collar or the size of the outlet of the draft hood supplied by the manufacturer of a gas-designed appliance.
10. Two or more gas appliances may be vented through a common vent connector when necessary, provided that the size of the common flue or vent is sufficient to accommodate the total volume of combustion products.
11. *A draft hood shall be installed in the position for which it was designed with reference to the horizontal and vertical planes and shall be so located that the relief opening is not obstructed by any part of the appliance or adjacent construction. If the draft hood is not a part of the appliance or supplied by the appliance manufacturer, it shall be the same size as the appliance vent collar on gas designed equipment. The draft hood shall always be installed in the same room as the appliance.
12. An automatically controlled gas appliance connected to a chimney which also serves equipment for the combustion of solid or liquid fuels shall be equipped with an automatic pilot.
13. The Company will consult with owners, architects or contractors in making vent layouts for special installation requirements.

C. VENT SIZING

Particular attention must be given to cases where more than one gas appliance is connected to the same vent to determine that the vent is large

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enough. When more than one appliance is connected to a gas vent or chimney, the area of the passageway shall not be less than the area of the largest vent connector plus fifty percent of the areas of additional vent connectors.

D. AIR FOR COMBUSTION AND VENTILATION*

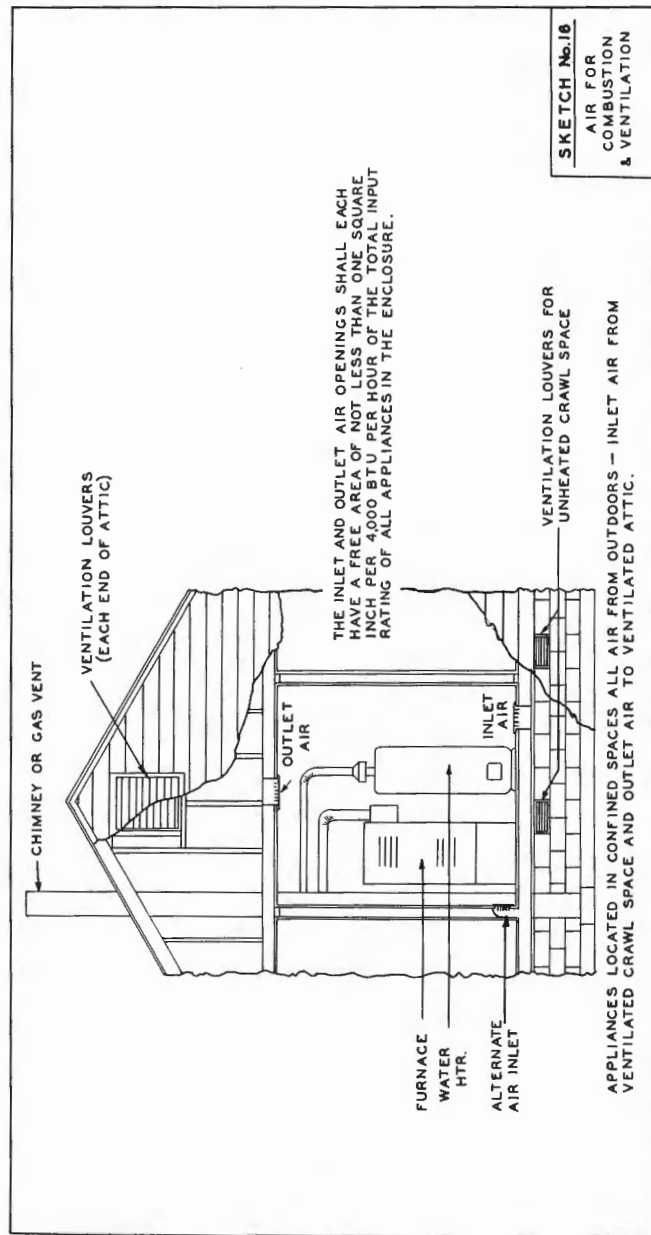
Appliances shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting and the maintenance of ambient temperature at safe limits under normal conditions of use. Appliances shall be located in such a manner as not to interfere with proper circulation of air within the confined space. When buildings are so tight that normal infiltration does not meet air requirements, outside air shall be introduced.

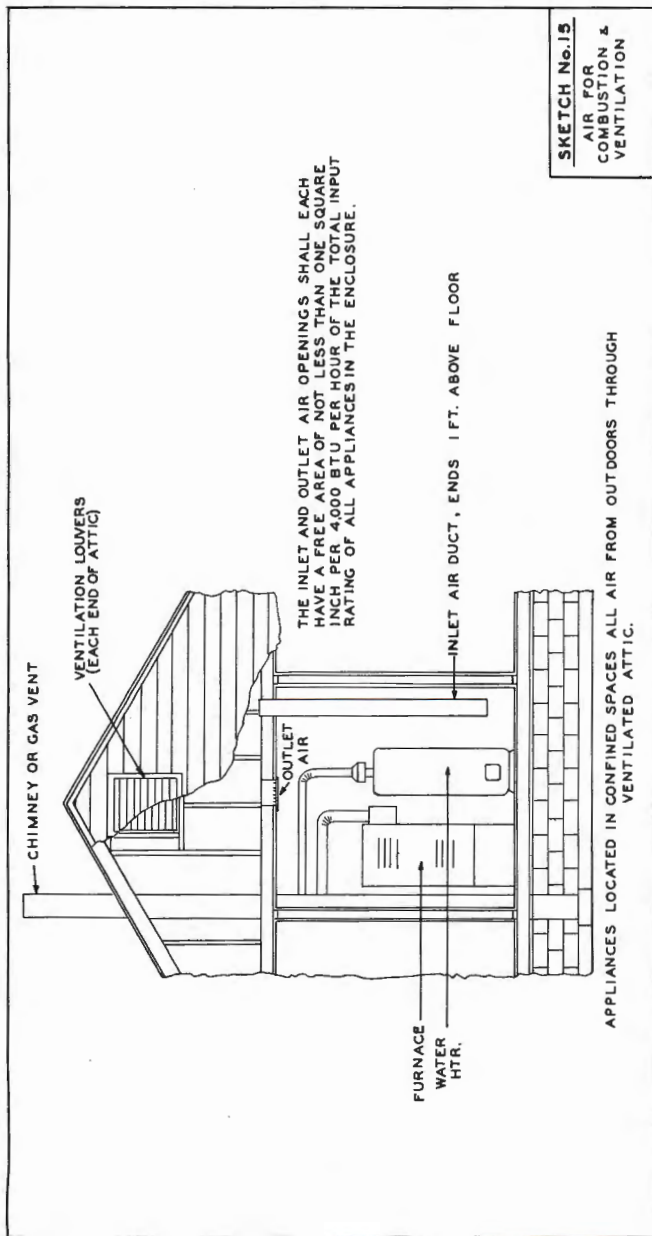
While all forms of building construction cannot be covered in detail, air for combustion, ventilation and draft hood dilution for gas appliances vented by natural draft normally may be obtained by application of one of the following methods.

1. Appliances Located in Unconfined Spaces

- a. In unconfined spaces in buildings of conventional frame, brick or stone construction, infiltration normally is adequate to provide air for combustion, ventilation and draft hood dilution.
- b. If the unconfined space is within a building of unusually tight construction, air for combustion, ventilation and draft hood dilution shall be obtained from outdoors or from spaces freely communicating with the outdoors. Under these conditions a permanent opening or openings having a total free area of not less than one square inch per 5,000 Btu per hour of total input rating of all appliances shall be provided. Ducts used to convey make-up air from the outdoors shall be of the same cross-sectional area as the free area of the openings to which they

*Information taken from American Standard Installation of Gas Appliances and Gas Piping (Z 21.30-1959) Sponsored by The American Gas Association, 420 Lexington Avenue, New York 17, New York.





connect. Such ducts connected to the outside air only may be connected to the cold air return of the heating system. The minimum dimension of rectangular air ducts shall be not less than three inches.

2. Appliances Located in Confined Spaces

a. All Air from Inside Building

The confined space shall be provided with two permanent openings, one near the top of the enclosure and one near the bottom. Each opening shall have a free area of not less than one square inch per 1,000 Btu per hour of the total input rating of all appliances in the enclosure, freely communicating with interior areas having in turn adequate infiltration from the outside (See Sketch No. 13).

b. All Air from Outdoors

The confined space shall be provided with two permanent openings, one in or near the top of the enclosure and one in or near the bottom. The openings shall communicate directly, or by means of ducts, with outdoors or to such spaces (crawl or attic) that freely communicate with outdoors (See Sketch Nos. 14, 15 and 16).

When directly communicating with outdoors or by means of vertical ducts, each opening shall have a free area of not less than one square inch per 4,000 Btu per hour of total input rating of all appliances in the enclosure. If horizontal ducts are used, each opening shall have a free area of not less than one square inch per 2,000 Btu per hour of total input of all appliances in the enclosure.

Ducts shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than three inches.

c. Ventilation Air from Inside Building —

Combustion and Draft Hood Dilution Air from Outdoors

The enclosure shall be provided with two openings for ventilation, located and sized as described in Paragraph 2a for appliances located in confined spaces. In addition, there shall be one opening directly communicating with outdoors or to such spaces (crawl or attic) that freely communicate with outdoors. This opening shall have a free area of not less than one square inch per 5,000 Btu per hour of total input of all appliances in the enclosure.

A duct used to convey make-up air shall be of the same cross-sectional area as the free area of the opening required. Such ducts connected directly to outdoor air only may be connected to the cold air return of the heating system. The minimum dimension of rectangular air ducts shall be not less than three inches (See Sketch No. 17).

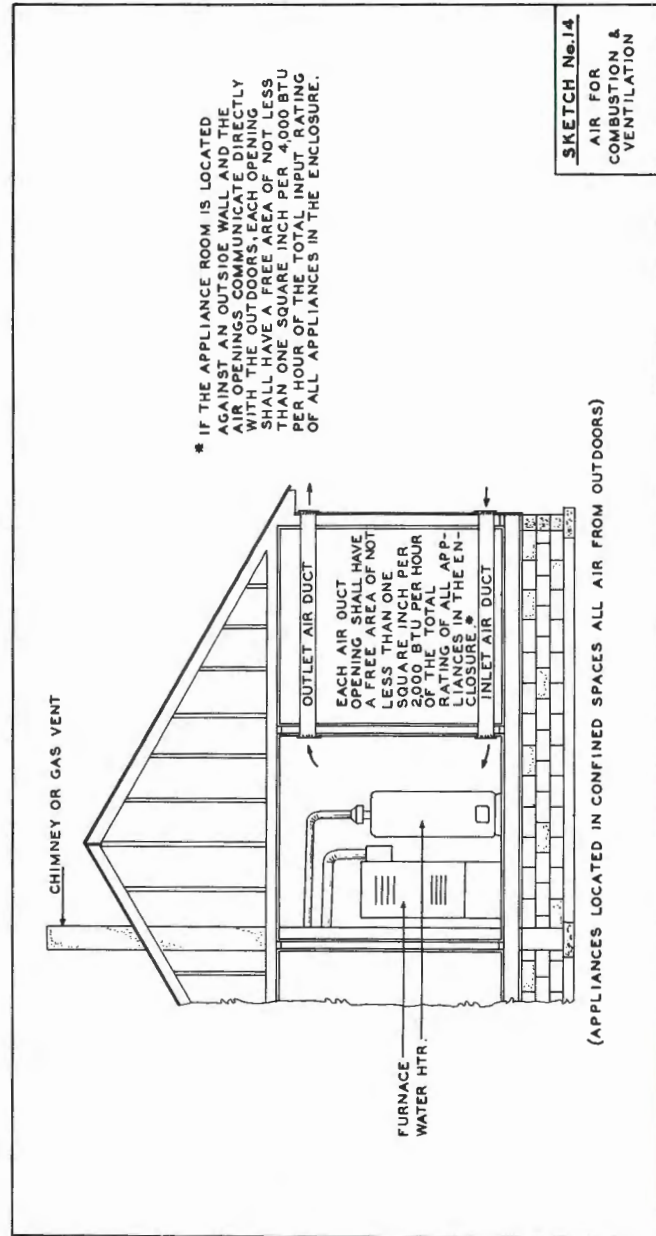
3. Louvers and Grilles

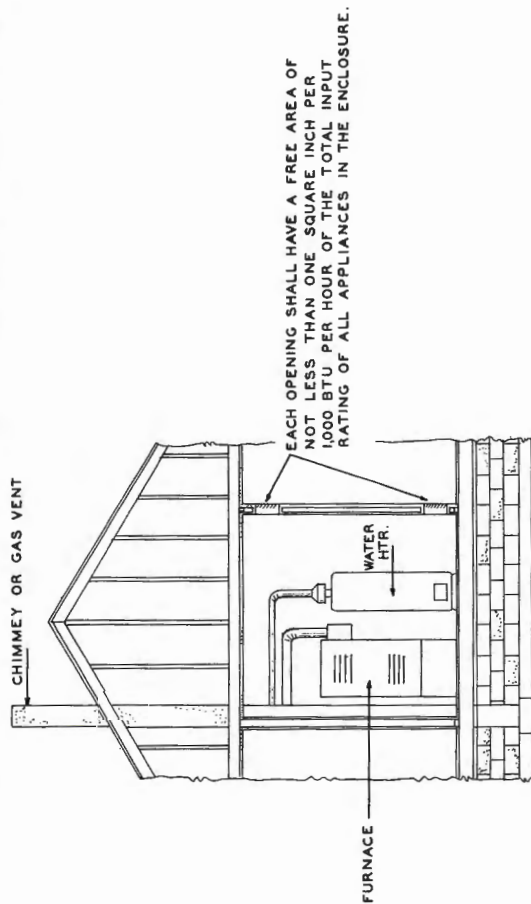
In calculating free area for appliances, consideration shall be given to the blocking effect of louvers, grilles, or screens protecting openings. Screens used shall not be smaller than $\frac{1}{4}$ inch mesh. If the free area through a design of louver or grille is known, it should be used in calculating the size opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25 percent free area and metal louvers and grilles will have 60-75 percent free area.

4. Special Conditions Created by Mechanical Exhausting or Fireplaces

Operation of exhaust fans, kitchen ventilation systems, clothes dryers or fireplaces may create conditions requiring special attention to avoid unsatisfactory operation of installed gas appliances.

5. Specially Engineered Installations





(APPLIANCES LOCATED IN CONFINED SPACES, ALL AIR FROM INSIDE THE BUILDING)

The size of combustion air openings specified in Paragraphs 1a and b, and 2a, b, and c shall not necessarily govern when special engineering assures an adequate supply of air for combustion, ventilation and draft hood dilution.

E. INDIVIDUAL VENT DESIGN

In order to provide a guide for designing or checking individual gas vents the following information is offered.*

Sketch No. 18 — Two typical conditions are illustrated which might cause a downdraft in a chimney. In addition to outside influences, downdrafts are commonly caused by exhaust fans within the building.

Sketch No. 19 — Three common types of draft hoods are illustrated. It should be noted that each appears in its proper mounting plane. Vertical draft hoods must never be tilted as spillage of flue products will result.

Sketch No. 20 — The basic components of two types of single appliance vent systems are illustrated.

Sketch No. 21 — This table is used to determine flue sizes, heights, and lengths required for any given heat input. This chart applies to masonry chimneys with single wall pipe vent connectors. The chart assumes two 90 degree ells in the vent system employing a draft hood with a top opening.

Sketch No. 22 — This table is similar to that in Sketch No. 21, except that it is used for double wall metal vent pipe.

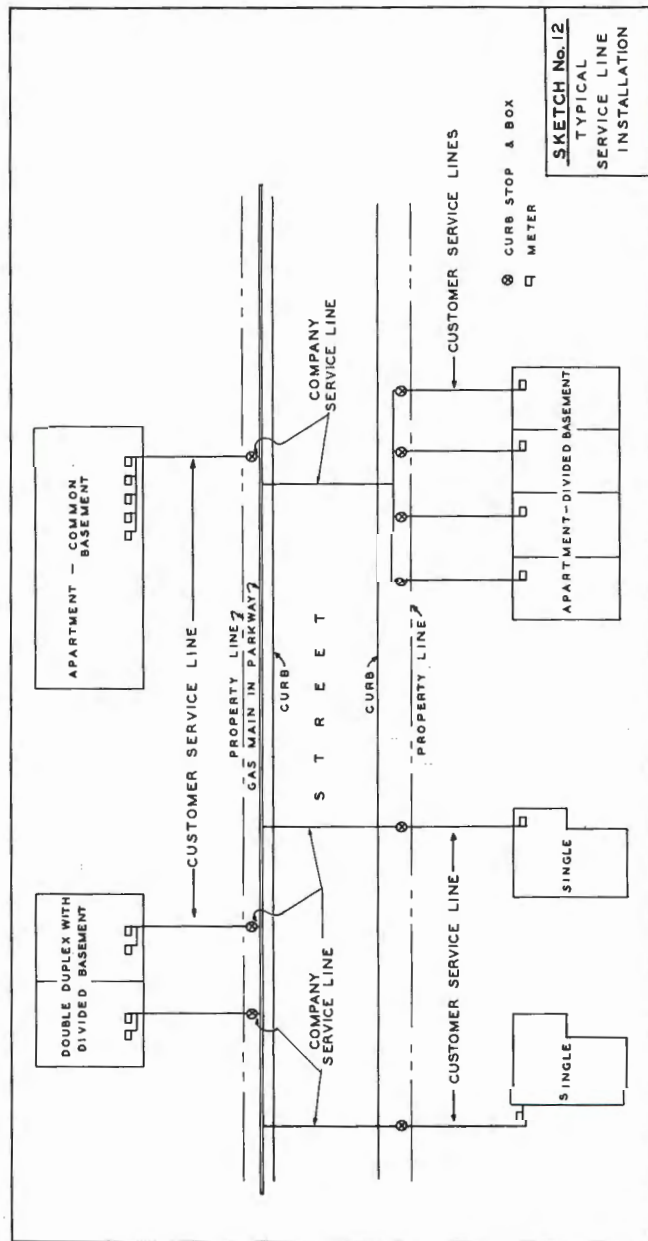
Sketch No. 23 — This table is similar to that in Sketch Nos. 21 and 22, except that it is used for single wall or asbestos cement vent pipe.

Sketch No. 24 — This table gives the diameter in inches of round ducts that have the same friction and capacity as various sizes of rectangular ducts.

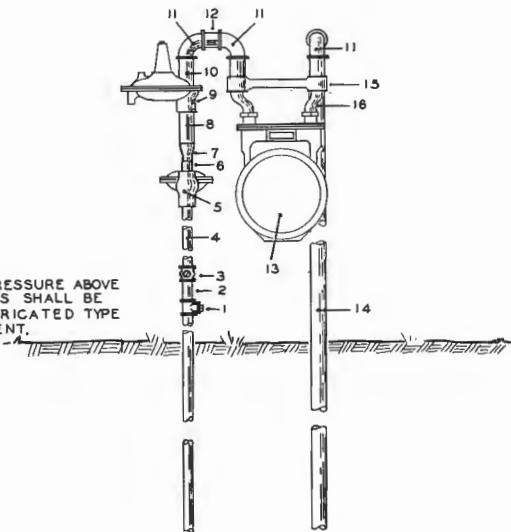
*Information taken from A.G.A. Research Report No. 1319, Gas Vent Tables. Available from American Gas Association Laboratories, 1032 East 62nd St., Cleveland 3, Ohio, or 1425 Grande Vista Avenue, Los Angeles 23, California.

Sketch No. 25 — Venting of two or more appliances sharing the same vent system is an equally important method of venting gas appliances. The terms describing the multiple appliance vent system are illustrated.

Sketch No. 26 } — Multiple appliance vent de-
 Sketch No. 27 } sign tables for double wall,
 Sketch No. 28 } single wall, and masonry chim-
 neys are presented. Each sketch is divided into two tables, one for the maximum heat input to the vent connector and the other for the maximum capacity of the common vent or chimney. Table A of the sketches for multiple appliances relates the common vent (or chimney) height, size and recommended maximum allowable heat input of all appliances connected to the vent system. In Table B of the sketches, Scale No. 1 is for appliances located in utility rooms of one story buildings. Scale No. 2 is for appliances located in basements and basements and/or utility rooms on the first floor of two or more storied buildings. The heat input refers to the rated heat input of the vented appliance.



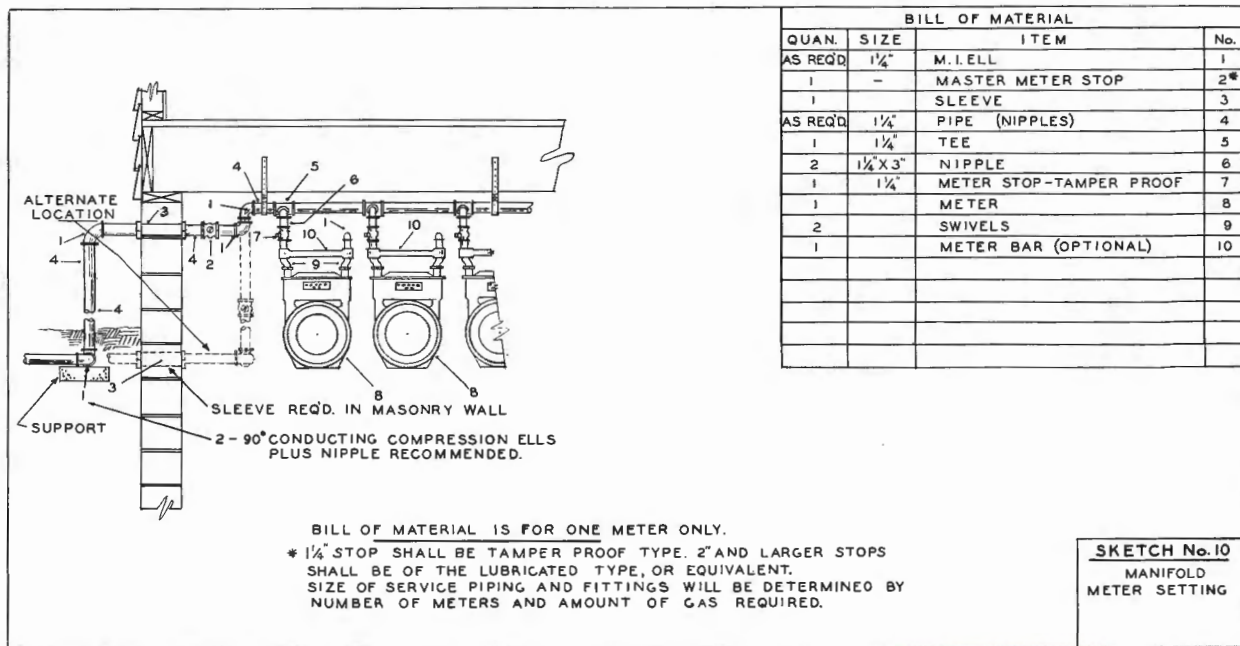
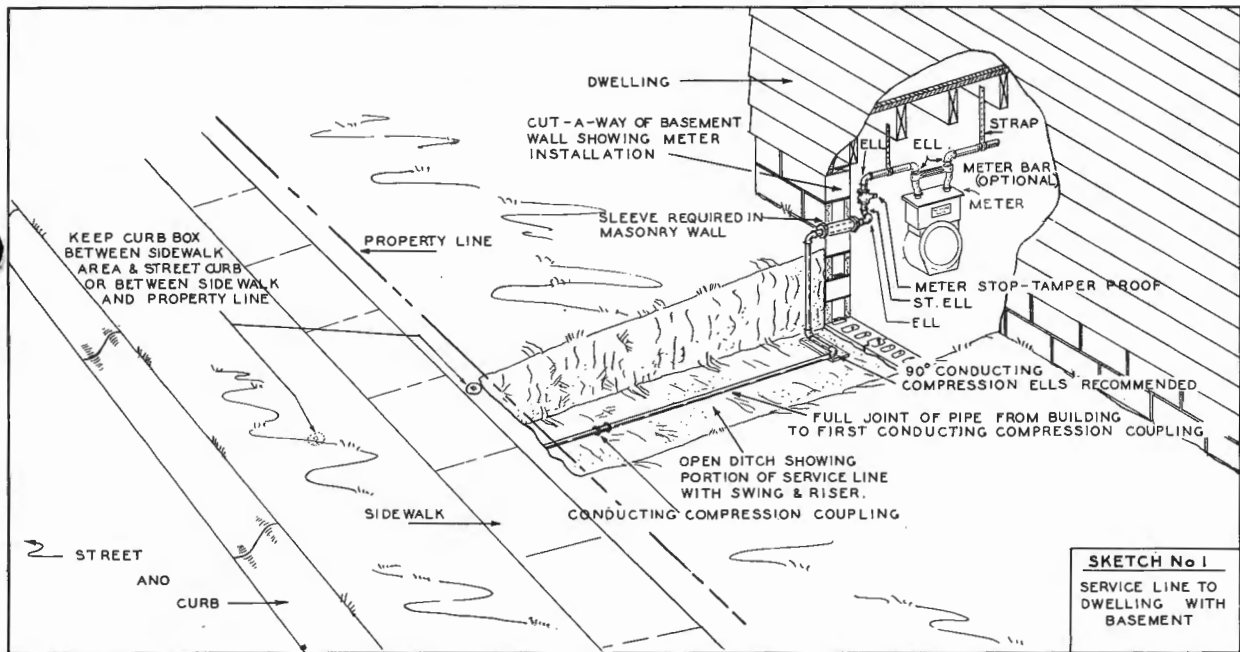
FOR INLET PRESSURE ABOVE
50 PSIG STOPS SHALL BE
OF THE LUBRICATED TYPE
OR EQUIVALENT.



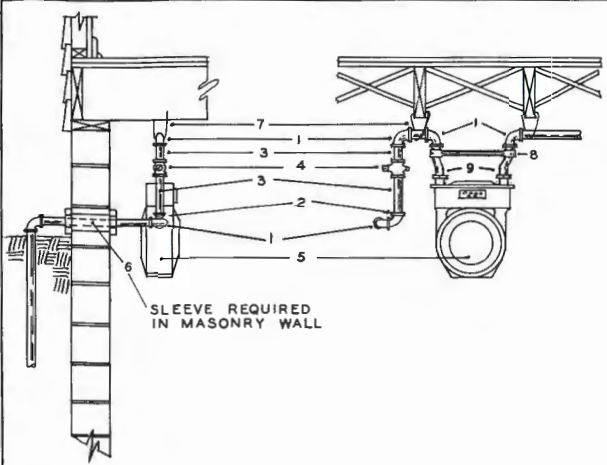
BILL OF MATERIAL			
QUAN.	SIZE	ITEM	No.
1	1"	TEE, PLUG DRILLED FOR SEAL WIRE	1
1	1" X 6"	NIPPLE	2
1	1"	METER STOP - TAMPER PROOF	3
1	1" X	NIPPLE	4
1	1"	REGULATOR	5
1	1" X 3"	NIPPLE	6
1	1" X 1 1/4"	REDUCER	7
1	1 1/4" X	NIPPLE	8
1	1 1/4"	REGULATOR	9
1	1 1/4" X	NIPPLE	10
3	1 1/4"	ELL	11
1	1 1/4" X 3"	NIPPLE	12
1		HARDCASE METER	13
AS REQD.	1 1/4"	PIPE	14
1		METER BAR (OPTIONAL)	15
2		SWIVELS	16

SKETCH No. 11
HIGH PRESSURE
HARDCASE METER
SETTING

SKETCHES
AND
TABLES



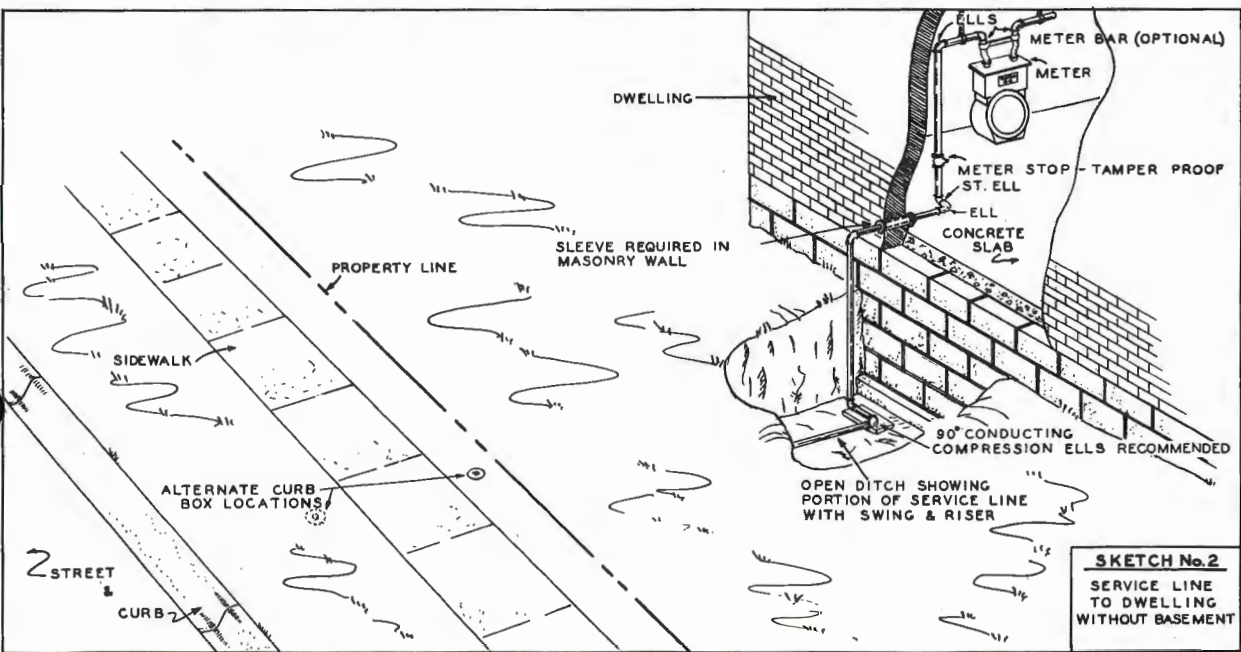
BILL OF MATERIAL IS FOR ONE METER ONLY.
 * 1 1/4" STOP SHALL BE TAMPER PROOF TYPE. 2" AND LARGER STOPS SHALL BE OF THE LUBRICATED TYPE, OR EQUIVALENT. SIZE OF SERVICE PIPING AND FITTINGS WILL BE DETERMINED BY NUMBER OF METERS AND AMOUNT OF GAS REQUIRED.



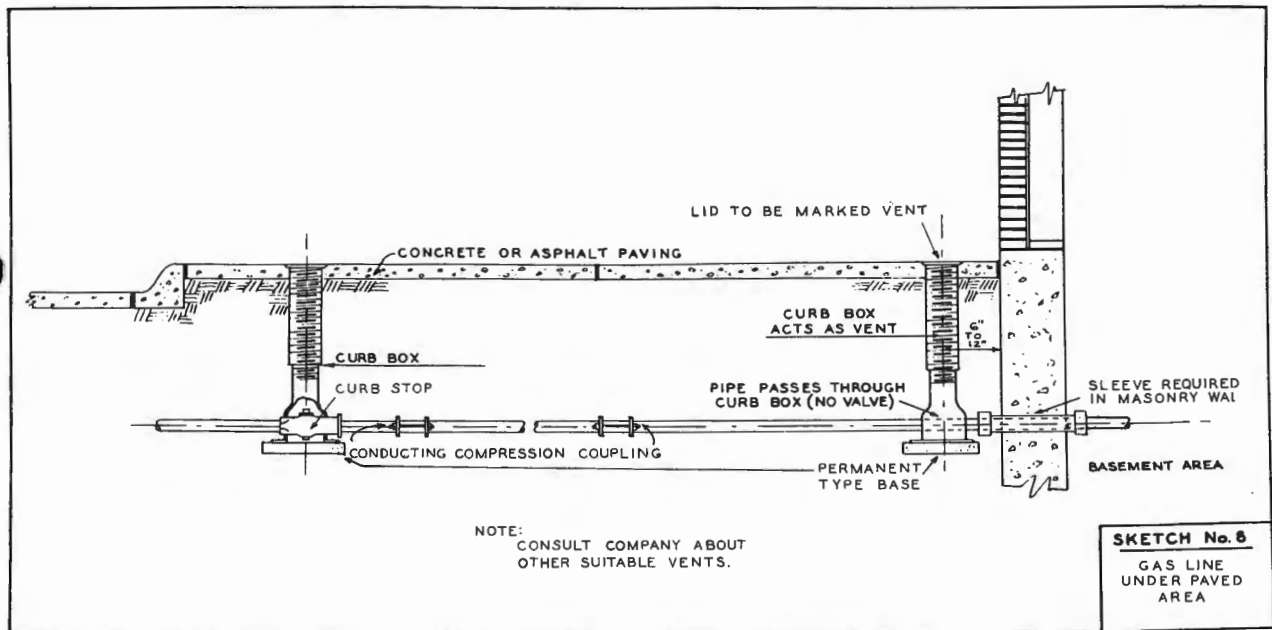
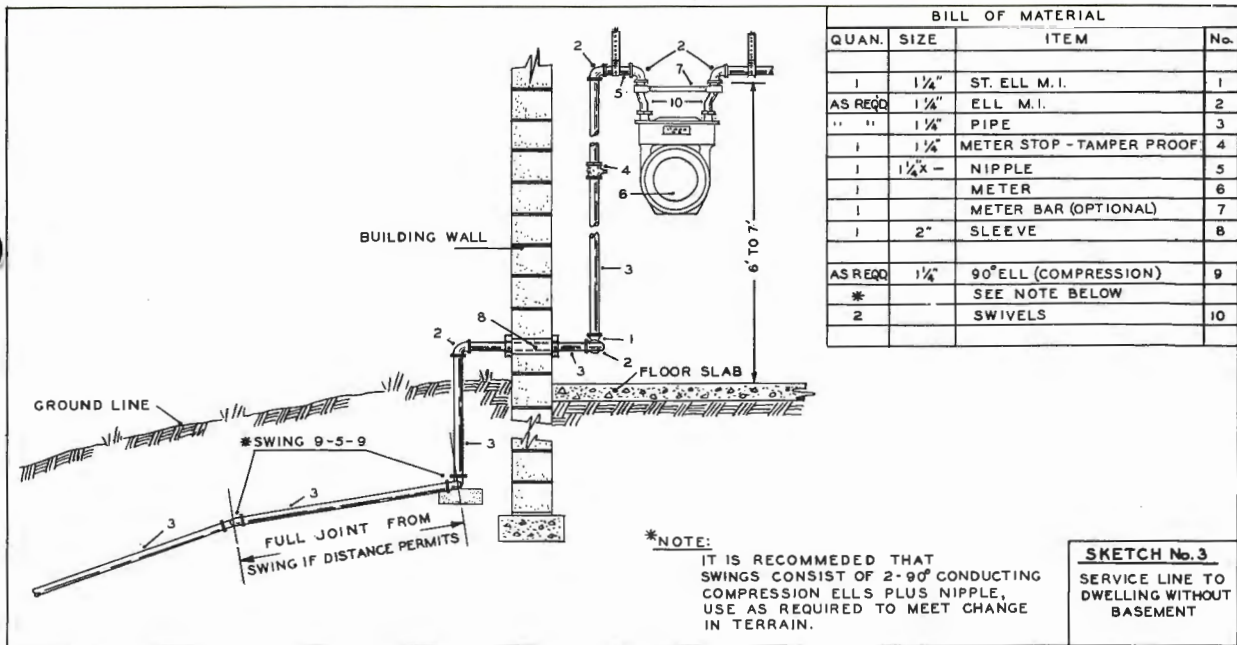
SLEEVE REQUIRED IN MASONRY WALL

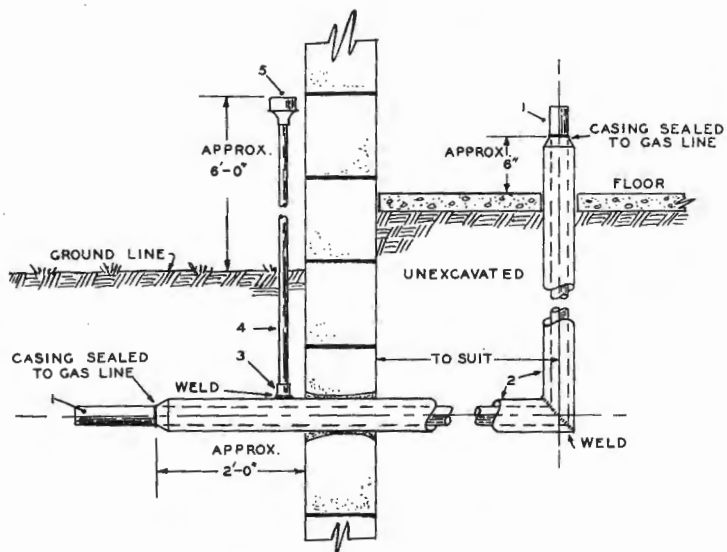
BILL OF MATERIAL			
QUAN.	SIZE	ITEM	No.
4	1/4"	ELL M.I.	1
1	1/4"	ST. ELL, M.I.	2
	1/4"	NIPPLE	3
1	1/4"	METER STOP - TAMPER PROOF	4
1		METER	5
1		SLEEVE	6
2	1/4"	PIPE STRAPS	7
1		METER BAR (OPTIONAL)	8
2		SWIVELS	9

SKETCH No. 9
HARDCASE
METER SETTING
INSIDE



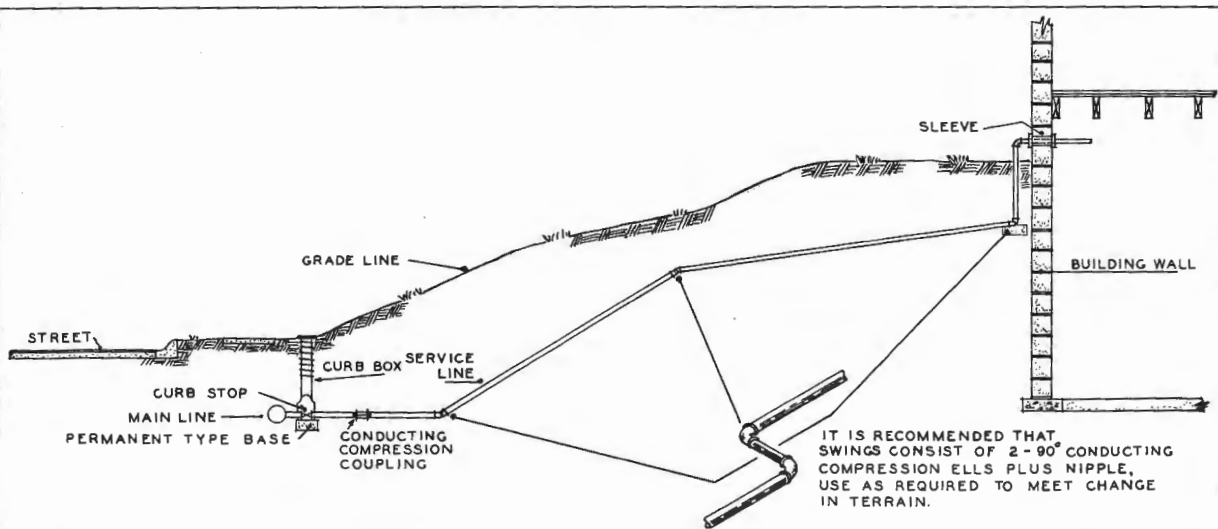
SKETCH No. 2
SERVICE LINE
TO DWELLING
WITHOUT BASEMENT





BILL OF MATERIAL			
QUAN.	SIZE	ITEM	No.
AS REQD	1 1/4"	PIPE	1
"	"	CASING	2
1	"	M.I. COLLAR	3
AS REQD	3/4"	PIPE	4
1	3/4"	VENT FITTING	5

SKETCH No. 7
 CASED GAS
 LINE LAID
 UNDER BUILDING



SKETCH No. 4
 SERVICE LINE WITH
 SWINGS FOR
 UNEVEN TERRAIN

