

trioxide. The volume of water vapor in the flue products from natural or coke oven gas is about twice the volume of carbon dioxide. It is extremely important that the chimney be tight and resistant to corrosion, not only from moisture, but also from dilute sulfur trioxide.

Clay linings with joints which prevent retention of moisture and linings made of non-corrosive materials, are advantageous. The protection of unlined chimneys has been investigated and the results indicate that after the loose material has been removed, spraying with a water emulsion of asphalt chromate will provide excellent protection.

Advice regarding recommended practice and materials for flue connections and chimney linings can usually be obtained from the local gas company, and should be given careful consideration.

Since a gas-designed appliance must be able to operate at rated input (plus 10 or 15 percent) without chimney connection, and without pro-

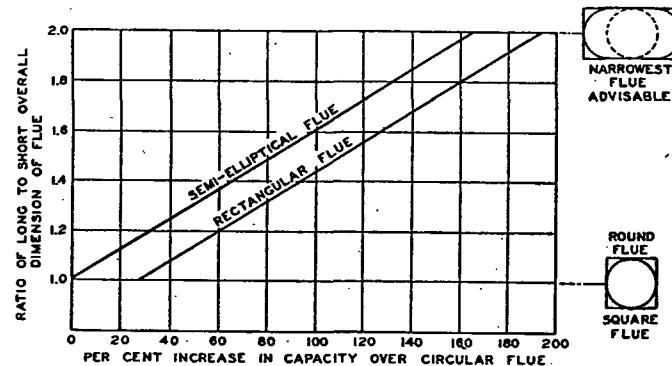


FIG. 8. CAPACITY OF A RECTANGULAR FLUE OR A SEMI-ELLIPTICAL FLUE, WITH SEMI-CIRCULAR ENDS HAVING ITS MINIMUM WIDTH EQUAL TO THE DIAMETER OF A CIRCULAR FLUE, COMPARED WITH THE CAPACITY OF THE CIRCULAR FLUE

ducing carbon monoxide, the only function of the chimney is to remove the products of combustion from the room. The chimney provides draft to overcome the friction in the flue pipe and chimney, but does not draw air into the appliance.

Chimneys for venting appliances designed for burning gas can therefore be low in height, but must have adequate area. The height is usually established by the building height. Chimney sizes are usually selected on the basis of Btu input of the appliance. One chart¹¹ designed to facilitate selection is shown in Fig. 7. The assumptions made in preparing the chart, as well as its limitations, should be noted carefully.

Since Fig. 7 has been prepared for circular flues, relative capacities for rectangular and semi-elliptical flues¹² are shown in Fig. 8.

When a flue is connected to several appliances, the number of horizontal runs, of various sizes, which may be substituted for the single run, having a diameter equal to that of the flue, may be obtained from Table 5.

RECOMMENDATIONS OF THE NATIONAL BOARD OF FIRE UNDERWRITERS

For general data on the construction of chimneys reference should be made to the Building Code, recommended by the *National Board of Fire*

Underwriters, Article X, Section 1001 to 1006, in which the following are some of the important provisions listed in the 1949 edition:

1. *Flue Connections Required.* Every heating apparatus or heat producing appliance requiring a flue connection shall be connected with a flue conforming to the provisions of this article. This shall not include electric appliances; gas appliances, except as specifically required in this article; nor oil fired appliances especially designed for use without flue connection.

2. *Use of Nonconforming Flues.* Flues not conforming to the requirements of this article for chimneys, metal smokestacks or vents for gas appliances, shall not be used unless listed by *Underwriters' Laboratories, Inc.*, installed in full compliance with the listing and the manufacturer's instructions, and approved for such use by the building official.

3. *Smoke Pipe Connections.*

a. No flue shall have smoke pipe connections in more than one story of a building, unless provision is made for effectively closing smoke pipe openings with devices made of noncombustible materials whenever their use is discontinued temporarily, and completely closing them with masonry when discontinued permanently.

TABLE 5. EQUIVALENT FLUE PIPE SIZES*

DIAMETER OF HORIZONTAL RUNS	SIZE OF FLUE						
	3	4	5	6	8	10	12
3	1	2	3	5	9	12	22
4		1	2	3	5	7	11
5			1	2	3	4	7
6				1	2	3	5
8					1	2	3

* Comfort Heating (American Gas Association).

b. Two or more smoke pipes shall not be joined for a single connection, unless the smoke pipes and flue are of sufficient size to serve all the appliances thus connected.

c. The smoke pipe of a heating appliance shall not be connected into the flue of an incinerator which has the rubbish chute identical with the smoke flue.

4. *Construction of Chimneys.*

a. Chimneys hereafter erected within or attached to a structure shall be constructed in compliance with the provisions of this section.

b. Chimneys shall extend at least 3 ft above the highest point where they pass through the roof of the building, and at least 2 ft higher than any ridge within 10 ft of such chimney.

c. Chimneys shall be wholly supported on masonry or self-supporting fireproof construction.

d. No chimney shall be corbeled from a wall more than 6 in.; nor shall a chimney be corbeled from a wall which is less than 12 in. in thickness, unless it projects equally on each side of the wall; provided that in the second story of 2-story dwellings corbeling of chimneys on the exterior of the enclosing walls may equal the wall thickness. In every case the corbeling shall not exceed 1 in. projection for each course of brick projected.

e. No change in the size or shape of a chimney, where the chimney passes through the roof, shall be made within a distance of 6 in. above or below the roof joists or rafters.

5. *Chimneys for Heating Appliances, Low Heat Industrial Appliances and Portable Type Incinerators.*

a. Chimneys for stoves, cooking ranges, warm air, hot water and low pressure steam heating furnaces, fireplaces, and low heat industrial appliances, other than chimneys for incinerators of nonportable type, shall be constructed of solid masonry units or of reinforced concrete. The walls shall be properly bonded or tied with corrosion-resistant metal anchors. In dwellings and buildings of like heating requirements, the thickness of the chimney shall be not less than 4 in. In other build-