Since Fig. 6 has been prepared for circular flues, relative capacities for rectangular and semi-elliptical flues[7] are shown in Fig. 7.

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 4.

CONSTRUCTION DETAILS

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 XI, Sections 1101 to 1105, in which the following are some of the important provisions listed in the 1943 edition:

(*a*) Chimneys erected within or attached to a structure shall be constructed of brick, of solid block masonry, or of reinforced concrete.

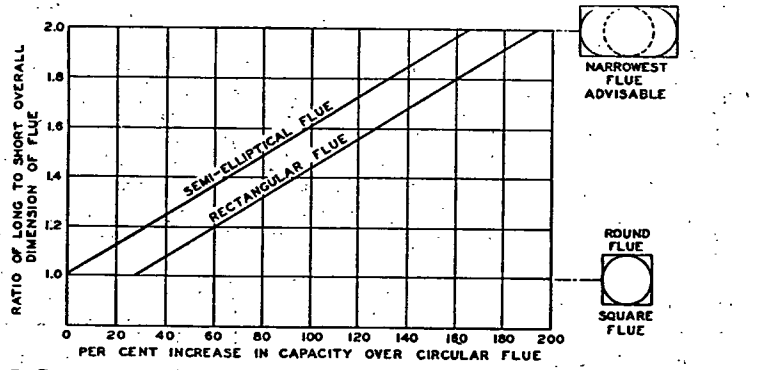


FIG. 7. CAPACITY OF A RECTANGULAR FLUE OR A SEMI-ELLIPTICAL FLUE, WITH SEMI-CIRCULAR ENDS HAVING ITS MINIMUM WIDTH EQUAL TO THE DIAMETER OF A CIRCULAR FLUE, COMPARED WITH THE CAPACITY OF THE CIRCULAR FLUE

(*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*) Every such chimney shall be properly capped with brick, terra cotta, stone, cast-iron, concrete or other approved non-combustible, weatherproof material.

(*d*) Chimneys shall be wholly supported on approved masonry or self-supporting fireproof construction.

(*e*) No such chimney shall be corbeled from a wall more than 6 in.; nor shall such 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 two-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.

(*f*) 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.

(*g*) Smoke flues for warm air, hot water and low pressure steam heating furnaces shall have walls not less than 8 in. thick; the walls may be of solid masonry using brick, stone or concrete, or of solid moulded or solid cast chimney units of concrete, or of burned clay, or of suitably reinforced solid concrete cast in place; provided that for stone masonry, other than sawed or dressed stone in courses, the thickness shall be not less than 12 in. The walls shall be properly bonded, or tied with non-corrosive

metal anchors. In dwellings and buildings of like heating requirements the thickness of the chimney walls may be reduced to not less than 3¾ in. when lined with a flue lining conforming to the Code requirements.

(*h*) Required flue linings shall be made of fire clay or other refractory clay to withstand the action of flue gases and to resist, without softening or cracking, the temperatures to which they will be subjected, but not less than 2,000 F, or of cast-iron of approved quality, form and construction. Approved corrosion resistant linings may be used in flues for gas appliances.

(*i*) Required clay flue linings shall be not less than ⅝ in. thick for the smaller flues and increasing in thickness for the larger flues.

(*j*) Flue linings shall be built ahead of the construction of the chimney as it is carried up, carefully bedded one on the other in mortar as hereinafter specified with close fitting joints left smooth on the inside.

(*k*) Flue linings shall start from a point not less than 8 in. below the intake. They shall extend, as nearly vertically as possible, for the entire height of the chimney. It is recommended that flue linings be extended 4 in. above the top or cap of the chimney.

(*l*) Only Portland cement mortar, cement lime mortar or fire clay mortar shall be used in setting flue linings.

For *gas appliances* the Building Code specifies lined chimneys and metal smoke stacks for all appliances which may be converted readily to the use of solid or liquid fuel and also for all boilers and furnaces except those having a flue gas temperature not exceeding 550 F at the outlet of the draft hood when burning gas at the manufacturer's rating and which may therefore be connected to *Type B* vent piping. Approved *Type B* vent piping is non-combustible, corrosion resistant piping of adequate strength and heat insulating value, and having bell and spigot or other acceptable joints. Fig. 6 may be used for selection of vent pipe size.

TABLE 4. EQUIVALENT FLUE PIPE SIZES[a]

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

[a] Comfort Heating (*American Gas Association*).

Important points to be considered in the use of *Type B* vent piping are:

1. *Type B* flues must be plainly and permanently marked, at the point where the vent connection enters the flue: *For use of gas appliances only.*

2. *Type B* vent material should not be used for external chimney flues and external runs of it should not exceed 3 ft outside the building roof. When this requirement makes it necessary to cross over through attic space, the piping should be pitched not less than 45 deg.

3. Because of the small size and low temperature, *Type B* vents should be provided with a vent cap with wire screening to prevent building of birds' nests.

4. Each appliance should have the equivalent of a 4 in. diameter *Type B* vent, even though the appliance may have a 3 in. flue collar. A typical minimum vertical flue size for a frame dwelling is 6 in. in diameter or equivalent.

5. When several floor furnaces are to be vented, it is acceptable practice to connect each of these by means of 4 in. vents to a common 6 in. vertical vent. Lateral