

boiler or furnace smoke-pipe is attached. The boiler or furnace smoke-pipe shall be thoroughly grouted into the chimney and shall not project beyond the inner surface of the flue lining.

The size or area of flue lining or of brick flue for warm-air furnaces depends on height of chimney and capacity of heating system. For chimneys not less than 35 ft. in height above grate line, the net internal dimensions of lining should be at least 7 x 11½ in. for a total leader pipe area up to 790 sq. in. Above 790 and up to 1000 sq. in. of leader pipe area the lining should be at least 11¼ x 11¼ in. inside. In case of brick flues not less than 35 ft. in height with no linings, the internal dimensions should be at least 8 x 12 in. up to 790 sq. in. of leader area, and at least 12 x 12 in. for leader capacities up to 1000 sq. in. Chimneys under 35 ft. in height are unsatisfactory in operation and hence should be avoided.

SMOKE TEST

The chimney flue shall be subjected to a smoke test by the mason contractor in the presence of the architect or his representative, after the mortar has thoroughly hardened, and must be *smoke tight*.

The method of conducting this test shall be as follows: With a good fire in the boiler or furnace, or in the base of the chimney, put about a square yard of tar paper on the fire. As soon as smoke appears at the top of the chimney close the top of the flue with a piece of old carpet or wet newspapers held down by a weighted board. Keep the tar paper burning in the firepot for five minutes. The architect or his representative shall sign an acceptance in triplicate, stating that the chimney was tight under the above test, and shall give one copy to the mason contractor, one copy to the heating contractor and one copy to the owner.

CHAPTER VII

MECHANICAL DRAFT

Data on Grates, Forced Draft, Induced Draft, Motor Driven Blowers, Steam Driven Blowers, Steam Jets, Stokers, Duct Work.

THE subject of mechanical draft is divided into two main divisions—forced draft and induced draft. Present day practice inclines towards forced draft for heating plants. The burning of the lower grades and the smaller sizes of coal necessitates strong drafts, which are frequently produced mechanically. The stack or chimney effect necessary to properly carry off the gases of combustion is sometimes produced by induced draft. With the type of installations considered in this chapter which relate particularly to the heating and ventilating field, forced draft installations predominate. The combination of both forced and induced draft is sometimes employed, but is usually confined to power stations where economizers, air heaters, etc. are installed.

In order to give proper recommendations for mechanical draft, something should be said about the grates and furnaces. Table 1 gives the various styles of grates suitable for different fuels in boiler plants mentioned in this article.

TABLE 1. GRATES SUITABLE FOR VARIOUS FUELS AND BOILERS

KIND OF FUEL	HIGH PRESSURE BOILERS	HIGH OR LOW PRESSURE STEEL BOILERS—FIRE BOX	LOW PRESSURE CAST IRON SECTIONAL	HIGH OR LOW PRESSURE SCOTCH MARINE	HIGH OR LOW PRESSURE UPRIGHT	TYPE OF AIR OPENINGS AND % OPENINGS
Domestic Anthracite	Stationary or Shaking	Shaking	Shaking	Shaking	Shaking	Herringbone Finger or Cross Rib 30% - 40%
No. 1 Buckwheat	Stationary or Dumping	Dumping	Dumping	Stationary or Dumping	Stationary Shaking or Dumping	Fine Herringbone Slotted or Pinhole 8% - 14%
No. 2 Buckwheat	Stationary or Dumping	Dumping	Dumping	Stationary or Dumping	Stationary or Dumping	Fine Slotted or Pinhole 8% - 12%
No. 3 Buckwheat Screenings	Stationary or Dumping	Dumping	Dumping	Stationary or Dumping	Stationary or Dumping	Fine Slotted or Pinhole 8% - 10%
Run of Mine Bituminous	Stationary or Shaking	Shaking	Shaking	Stationary or Shaking	Stationary or Shaking	Herringbone or Cross Rib 30% - 40%

The material for this Chapter prepared especially for THE GUIDE by R. W. Pryor, Edgar Johnson and C. H. Smith.