

Efficiency

The efficiency of electricity in direct heaters is 100 per cent. There is only a small loss due to transmission through the wiring system. The effective use of insulation on heat-storing water tanks as used in indirect electrical heating reduces the radiation losses practically to a negligible amount. The efficiency of electricity as a heating agent, then, is a maximum.

CHAPTER 14

CHIMNEYS

Natural, Forced and Induced Draft; Theoretical and Available Draft; Friction Losses; Chimneys for Coal, Oil and Gas Fuels; Details of Construction; Underwriters' Rules.

THE purpose of a chimney is to produce the required draft as well as to carry off the products of combustion and to discharge them so that they will not be harmful or annoying.

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The draft required where *natural draft* is employed is equal to the sum of the following items:

1. That required to overcome the friction and to produce the velocity of the air at the entrance to the furnace.
2. That necessary to force the air through the fuel bed (if any).
3. That necessary to produce the velocity and to overcome the friction of the products of combustion in their passage through the heat absorbing surfaces.
4. That necessary to produce the velocity and to overcome the friction of the products of combustion in their passage through the breeching, from the heater to the chimney.
5. That necessary to produce the velocity and to overcome the friction of the products of combustion in their passage through the chimney itself.

The draft required where *forced draft* is employed is the sum of items 3, 4 and 5; items 1 and 2 usually being taken care of by the forced draft apparatus.

When *induced draft* is employed the entire draft required is generally taken care of by the induced draft apparatus.

In the case of either forced or induced draft any part of the required draft may be taken care of by the chimney and the remainder by the apparatus, but the exact conditions to be met in this respect should be known and the chimney should be proportioned accordingly.

The combination of natural and mechanical draft is frequently used, especially where loads are quite irregular, so that the plant may be run on natural draft during light loads and on mechanical draft during peak-loads, only. This combination also affords a factor of safety against breakdowns in the mechanical draft equipment, since at least a partial load may always be carried on natural draft.

Draft measurement is usually in inches of water; by which is meant the static head of water (in inches) corresponding to the difference in pressure between any point in the heater, breeching or chimney, at which the draft is being measured, and the pressure of the surrounding atmosphere.