

Up-Feed System (Steam): A steam heating system in which the supply mains are below the level of the heating units which they serve.

Vacuum Heating System: A two-pipe steam heating system equipped with the necessary accessory apparatus which will permit operating the system below atmospheric pressure when desired.

Vapor: Any substance in the gaseous state.

Vapor Heating System: A steam heating system which operates under pressures at or near atmospheric and which returns the condensation to the boiler or receiver by gravity. Vapor systems have thermostatic traps or other means of resistance on the return ends of the heating units for preventing steam from entering the return mains; they also have a pressure-equalizing and air-eliminating device at the end of the dry return. **Direct Vent Vapor System:** A vapor heating system with air valves which do not permit re-entry of air.

Vapor Pressure: Synonymous with saturation pressure in the case of a pure substance.

Velocity: The time rate of motion of a body in a fixed direction. In the fps system it is expressed in units of one foot per second. $V = \frac{s}{t}$.

Velocity Pressure: The difference due to velocity between total pressure and static pressure. It is supposed to equal the kinetic energy per unit volume of the fluid at the point of measurement.

Ventilation: The process of supplying or removing air by natural or mechanical means, to or from any space. Such air may or may not have been conditioned. (See *Air Conditioning*.)

Warm Air Heating System: A warm air heating plant consists of a heating unit (fuel-burning furnace) enclosed in a casing, from which the heated air is distributed to the various rooms of the building through ducts. If the motive head producing flow depends on the difference in weight between the heated air leaving the casing and the cooler air entering the bottom of the casing, it is termed a *gravity* system. A booster fan may, however, be used in conjunction with a gravity-designed system. If a fan is used to produce circulation and the system is designed especially for fan circulation, it is termed a *fan furnace* system or a *central fan furnace* system. A fan furnace system may include air washers and filters.

Wet-Bulb Temperature: *Thermodynamic wet-bulb temperature* is the temperature at which liquid or solid water, by evaporating into air, can bring the air to saturation adiabatically at the same temperature. *Wet-bulb temperature* (without qualification) is the temperature indicated by a wet-bulb psychrometer constructed and used according to specifications. (A.S.M.E. Power Test Codes, Series 1932, Instruments and Apparatus, Part 18.)

Wet Return: That part of a return main of a steam heating system which is filled with water of condensation. The wet return usually is below the level of the water line in the boiler, although not necessarily so. (See *Dry Return*.)

CHAPTER 48

Abbreviations, Symbols, Standards

Standard Abbreviations, Conversion Equations, Graphical Symbols for Piping, Ductwork, Heating and Ventilating, Refrigerating, Specific Heat Table, State Codes or Standards

THE abbreviations outlined herewith pertaining to heating, ventilating, and air conditioning have been compiled from a selected list of approved standards¹. In general the period has been omitted in all these abbreviations except where the omission results in the formation of an English word. Grouped together in this chapter will be found a few conveniently arranged conversion equations. The graphical symbols for drawings have been abstracted from a recently approved standard².

The specific heats of a selected list of solids, liquids, gases and vapors are given in Tables 1, 2 and 3.

An outline of available state codes, standards or laws relating to the heating, ventilating, or air conditioning of various types of buildings is given in Table 4. This material was compiled by the A.S.H.V.E. and is based on information furnished by the individual states through a comprehensive survey conducted in 1943. References are given to the titles of all codes, standards or laws which relate to this field of engineering and where copies of these standards may be obtained.

Absolute	abs
Acceleration, due to gravity	g
Acceleration, linear	a
Air horsepower	air hp
Alternating-current (as adjective)	a-c
Ampere	amp
Ampere-hour	amp-hr
Area	A
Atmosphere	atm
Average	avg
Avoirdupois	avdp
Barometer	bar.
Boiler pressure	bp
Boiling point	bp
Brake horsepower	bhp
Brake horsepower-hour	bhp-hr
British thermal unit	Btu
Calorie	cal
Centigram	cg
Centimeter	cm

¹Abbreviations for Scientific and Engineering Terms, Z10.1-1941; Letter Symbols for Mechanics of Solid Bodies, Z10.3-1942, and Letter Symbols for Heat and Thermodynamics, Z10.4-1943 (*American Standards Association*).

²Graphical Symbols for Use on Drawings in Mechanical Engineering, Z32.2-1941 (*American Standards Association*).