Relative kinematic viscosity ..... $\nu/\nu_w$

Time in seconds obtained from a viscosity measurement with a specific instrument, from which viscosity may be computed by appropriate formulas ..... $t$

## *Symbols for General Thermodynamics*

Mechanical equivalent of heat ..... $J$

Heat equivalent of work ..... $1/J$ or $A$

Ordinary temperature, F or C ($\theta$ is preferably used only when $t$ is used for Time in the same discussion) ..... $\theta$ (theta) or $t$

Absolute temperature, F abs or K. $\Theta$ or $T$ [$\Theta$ (capital theta) is preferably used only when $\theta$ is used for ordinary temperature].

Gas Constant in equation $pv = RT$ ..... $R$

Two values are in customary use. The first is the universal constant, corresponding to $v$ in the above equation as volume per mol (product of molecular weight and volume per unit weight). The second is the particular value for a given gas, corresponding to $v$ as volume per unit weight. The second value is the first value divided by molecular weight $M$. If desired, a prime or a subscript may be used to distinguish between the two values.

Quality of Steam, pounds of dry steam per pound of *mixture* ..... $x$

Exponent of Polytropic expansion, $pv^n = \text{const}$ ..... $n$

Joule-Thomson coefficient, $\mu = (dT/dp)_h$ ..... (mu) $\mu$

Adiabatic Factor ..... $Y$

$$Y = \left(\frac{p_1}{p_2}\right)^{(k-1)/k} - 1$$

## *Symbols for the Thermodynamic Quantities*

Entropy. (The capital should be used for any weight, and small letter, for unit weight) ..... $S$ or $s$

Internal Energy; Intrinsic Energy. The capital should be used for any weight and the small letter for unit weight ..... $U$ or $u$

Heat Content; Total Heat; Enthalpy. The capital should be used for any weight and the small letter for unit weight ..... $H$ or $h$

$$h = u + A\,pv$$

Helmholtz Free Energy; Internal Potential Function ..... (psi) $\psi$

$$\psi = u - Ts$$

Gibbs Function; Total Potential Function ..... $z$ or (Zeta) $\zeta$

$$z = u + A\,pv - Ts$$

## *Symbols for Saturation, Vaporization, Etc.*

Saturated liquid at saturation pressure and temperature; Liquid in contact with vapor ..... *subscript* $f$

Dry saturated vapor; dry saturated gas at saturation pressure and temperature; Vapor in contact with liquid ..... *subscript* $g$

This system, carried to a logical conclusion, requires also subscripts for Liquid in contact with Solid. Solid in contact with Vapor and Vapor in contact with Solid. However, these subscripts are not assigned at this time. Pairs of subscripts would also denote values for fusion or melting and sublimation.

Conditions at critical point ..... *subscript* $c$

Vaporization values at constant pressure; Differences between values for saturated vapor and saturated liquid at the same pressure ..... *subscript* $fg$

Heat content of saturated liquid; Total heat of saturated liquid; Enthalpy of saturated liquid, sometimes called heat of the liquid ..... $h_f$

Heat content of dry saturated vapor; Total heat of dry saturated vapor; Enthalpy of dry saturated vapor ..... $h_g$

Various values for saturation; Various values for vaporization, according to above rules ..... $v_f$, $v_g$, $v_{fg}$

Saturation pressure; Saturation temperature ..... $p_f$, $t_f$ and $T_f$ or $p_g$, $t_g$ and $T_g$

Heat of vaporization at constant pressure ..... $L$ or $h_{fg}$

Heat of Fusion and Heat of sublimation may be denoted by subscipts affixed to the symbols $L$ or $h$.

## *Symbols for Heat Transmission*[5]

Terms ending "ivity" designate properties independent of size or shape, sometimes called "specific properties." Examples are—conductivity and resistivity.

[5]Joint report of the Committee on Heat Transmission, *National Research Council* and Sub-committee on Symbols for Heat and Thermodynamics, *American Standards Association*.





Terms ending "ance" designate quantities depending not only on the material, but also upon size and shape, sometimes called "total quantities." Examples are—conductance and transmittance.

Terms ending "ion" designate rate of heat transfer. Examples are—conduction and transmission.

Area ..... $A$

Temperature, F or C ..... $t$

Temperature, F abs or K ..... $T$

Length of path of heat flow, thickness ..... $L$

Total Quantity of heat transferred ..... $Q$

Time (when $t$ is used for temperature ..... (tau) $\tau$

Thermal transmission (heat transferred per unit time) ..... $q$

$$q = Q/\tau$$

Thermal conductivity (heat transferred per unit time per unit area, and per degree per unit lenth) ..... $k$

$$k = \frac{q/A}{(t_1 - t_2)/L}$$

Thermal resistivity ..... $1/k$

Thermal resistance (degrees, per unit of heat transferred per unit time) ..... $R$

$$R = \frac{t_1 - t_2}{q} = \frac{L}{kA}$$

Thermal conductance (heat transferred per unit time, per degree) ..... $C$

$$C = \frac{1}{R} = \frac{kA}{L} = \frac{q}{t_1 - t_2}$$

Thermal conductance per unit area, sometimes called *Unit Conductance* (heat transferred per unit time per unit area, per degree) ..... $C_A$

$$C_A = \frac{C}{A} = \frac{1}{RA} = \frac{q}{A\,(t_1 - t_2)} = \frac{k}{L}$$

Surface coefficient of heat transfer, Film coefficient of heat transfer, Individual coefficient of heat transfer (heat transferred per unit time per unit area, per degree) ..... $h$

$$h = \frac{q/A}{t_1 - t_2}$$

(In general $h$ is not equal to $k/L$, where $L$ is the actual thickness of the fluid film).

Thermal transmittance per unit area, Overall coefficient of heat transfer (heat transferred per unit time per unit area, per degree overall) ..... $U$

$$U = \frac{q/A}{t_1 - t_2}$$

## *SYMBOLS FOR HEATING AND VENTILATING DRAWINGS*[6]

1. The objects of this standard set of symbols are to insure the correct interpretation of drawings and to conserve drafting room time by establishing simple and unmistakable symbols for the component parts of the heating and ventilating systems. In preparing the list of symbols an effort has been made to follow existing practice in so far as possible but the list cannot be expected to match exactly the existing practice of every drafting room.

2. Simplicity, ease of execution and unmistakable identification were carefully considered in selecting the symbols. Uncommon fittings and appliances such as vacuum pumps, separators, etc., have purposely been omitted in order to produce a list which can be easily remembered. It is assumed that when the scale of the drawing permits, the valves and fittings will be drawn to scale and a conventional representation is then unnecessary.

3. High pressure steam supply pipe ——————

4. Low pressure steam supply pipe ——————

5. Hot water pipe—flow ——·——·——

6. Return pipe—steam or water - - - - - - - - - -

7. Air vent line ——···——···——

[6]From A.S.H.V.E. CODE OF MINIMUM REQUIREMENTS FOR THE HEATING AND VENTILATION OF BUILDINGS.