GLOSSARY OF TERMS

Absolute pressure – Total pressure measured from absolute zero i.e. a perfect vacuum. As a practical matter, gauge pressure plus atmospheric pressure.

Absolute temperature – Temperature measured from absolute zero. In the Fahrenheit scale it is gauge temperature plus 460 degrees and is called Rankine temperature; in the Centigrade scale it is gauge temperature plus 273 degrees and is called Kelvin temperature.

ACFM – Actual Cubic Feet per Minute. The actual flow of air or gas delivered to the discharge connection of a compressor stated in cubic feet per minute under the conditions of temperature and pressure prevailing at the inlet of the compressor. ACFM for a given compressor running at a given speed remains constant irrespective of the temperature, atmospheric pressure or altitude of the operating site of the compressor.

Adiabatic Compression – Compression process when all heat of compression is retained in the gas being compressed.

Aftercooler – Heat exchanger for cooling the discharge of a compressor. May be air or water cooled. An effective means of removing moisture from the compressed air.

Approach – (Generally, “approach temperature”). The difference in temperature between the discharge from a cooler (intercooler or aftercooler) and the inlet temperature of the cooling medium; usually air or water.

Capacity – The capacity of a compressor is the flow of gas compressed and delivered at full rated speed at conditions of temperature, pressure and gas composition (including relative humidity) prevailing at the compressor inlet. Capacity may be actual or rated.

Capacity, actual – The quantity of gas actually compressed and delivered to the discharge of a compressor running at full rated speed and under rated pressure conditions. Actual capacity is usually expressed in cubic feet per minute (CFM) at the conditions prevailing at the inlet to the first stage.

CFM – Cubic feet per minute.

Compressibility – A factor expressing the deviation of a gas from the laws of hydraulics.

Compression, adiabatic – Compression where no external heat is transferred to the gas and no heat is removed from the gas during the compression process. I.e. all heat of compression is retained in the gas. For perfect gases it is expressed by the equation PV is a constant, if the process is reversible.

Compression, isentropic – Compression with no increase in entropy; fully reversible adiabatic compression.

Compression, isothermal – Compression where the temperature of the gas remains constant during the compression process. I.e. all heat of compression is removed at the instant it is created.

Compression, polytropic – Compression in which the relationship between pressure and volume is expressed by the equation PV^n is a constant, where n is the polytropic exponent.

Compession ratio – The ratio of the absolute discharge pressure to the absolute intake pressure.

Critical pressure – The limiting value of saturation pressure as the saturation temperature approaches the critical temperature.

Critical temperature – The highest temperature at which well defined liquid and vapor states exist. It may be defined as the highest temperature at which it is possible to liquefy a gas by pressure alone.

Dew point – The temperature at which the vapor in a space (usually water vapor if not otherwise specified) at a given pressure will begin to condense (form dew).

Displacement – The volume swept out by the compressing element (piston, screw rotors, etc.) per unit of time; usually expressed in cubic feet per minute.

Dynamic compressors – machines in which air or gas is compressed by the action of rotating vanes or impellors imparting velocity and pressure to the flowing medium.

Efficiency – Usually expressed as a percentage; see following.

Efficiency, adiabatic – Ratio of calculated adiabatic work required to actual brake horsepower.

Efficiency, compression – Ratio of calculated isentropic work to actual thermodynamic work requirement of a compressor.

Efficiency, isothermal – Ratio of calculated isothermal work to actual thermodynamic work transferred to the gas during compression.

Efficiency, mechanical – Ratio of thermodynamic work requirement of a compressor to actual brake horsepower requirement. It reflects the friction, inertial, windage and other mechanical losses.

Efficiency, polytropic – Ratio of the polytropic compression energy transferred to the gas to the actual energy transferred to the gas.

Efficiency, volumetric – Ratio of actual capacity to displacement (swept volume).

Enthalpy (Heat content) – The sum of the internal and external energies of a substance.

Entropy – A measure of the unavailability of energy in a substance.

Exhauster – Term sometimes applied to a compressor in which the inlet pressure is less than atmospheric. A vacuum pump is an exhauster.

Expander – A machine mechanically similar to a compressor but in which a gas expands from a higher to a lower pressure doing work and undergoing a drop in temperature in the process. The drop in temperature is usually, but not necessarily, the principal objective. The orifice in a refrigeration system also produces an expansion of the gas and a drop in temperature, but an expander performs it more nearly isentropically, and is thus more efficient in a cryogenic process.

Free air – Air at atmospheric conditions at any specific location. Since altitude, barometric pressure, temperature and relative humidity may vary at different localities, it follows that a cubic foot of free air will always be a cubic foot but its temperature, density (weight), and composition may vary.

Gas – From a physical point of view air is a gas (one of the three phases of matter). In practice, however, the term is used to describe any gas other than air.

Horsepower, brake – The horsepower input to a driven machine shaft.

Horsepower, theoretical or ideal – The horsepower required to compress adiabatically the air or gas delivered by a compressor to a specified pressure.

Humidity, specific – The weight of water vapor in an air-vapor mixture per unit weight of dry air.

Humidity, relative - The ratio of the partial pressure of the vapor to the vapor saturation pressure at the dry bulb temperature of the mixture. I.e. the ratio of the actual weight of water vapor in the mixture to the maximum weight of vapor the mixture could hold at its given temperature. Also the degree of saturation, expressed as a percentage.

Intercooler – A heat exchanger (water or air cooled) to remove the heat of compression between stages of a multi-stage compressor. Usually also condenses and removes a significant amount of moisture.

Intercooling – Removal of heat of compression between stages of a multi-stage compressor.

Intercooling, degree of – The difference in temperature between the inlet of the compressor and the outlet of the intercooler expressed as an inverse percentage.

Intercooling, perfect – When the temperature of air leaving the intercooler is equal to the temperature at the intake of the compressor.

Liquid piston – A liquid piston compressor is a rotary compressor having a vaned rotor revolving in an elliptical casing with the spaces between the vanes sealed by a ring of liquid rotating with the rotor within the casing; also known as a liquid ring compressor or liquid ring vacuum pump.

Load factor – Ratio of the average load (consumption of compressed air) during a given period of time to the rated delivery of the compressor.

Normal air, normal conditions – A term formerly used to describe Standard Air and Standard Conditions, which see.

Positive displacement compressors – Compressors having mechanical devices (pistons in cylinders, or rotors in casings) in which successive volumes of air or gas are confined in a closed space and compressed by movement of the mechanical element (piston or rotor). Rotary screw compressors are positive displacement compressors.

Power, theoretical (polytropic) – The Power required to compress polytropically the gas or air delivered by a compressor to its rated pressure.

Pressure, absolute – see Absolute Pressure.

Pressure, critical – See Critical Pressure.

Pressure, discharge – Pressure at the discharge of the compressor package according to CAGI/PNEUROP code PN2CPTC2. Usually expressed as gauge pressure.

Pressure, gauge – Pressure indicated on a pressure gauge. Gauge pressure is absolute pressure minus atmospheric pressure i.e. pressure above atmospheric.

Pressure, inlet – Pressure at the intake to the compressor. Usually expressed as absolute pressure.

Pressure ratio – See Compression ratio.

Specific gravity – The ratio of the specific weight of air or a gas to that of dry air at the same temperature and pressure.

Specific heat – The quantity of heat required to raise the temperature of a unit weight of a substance by one degree of temperature; (whether Centigrade or Fahrenheit must be stated).

Specific weight – The weight of air or gas per unit of volume at specified conditions of temperature and pressure. Unless otherwise stated, it usually refers to conditions at the compressor intake.

Standard air – Air at specified standard conditions of temperature, pressure and humidity.

Standard conditions – Standard conditions vary by the industry and specifying authority. Standard conditions frequently encountered are:

ISO/CAGI/PNEUROP	68 deg F, 14.5 PSIA, Dry (0% RH) 20 deg C, 1 bar, Dry (0% RH)
API	60 deg F, 14.7 PSIA, Dry (0% RH)

SCFM – Standard cubic feet per minute. Air at standard conditions; (must be specified).

Supercompressibility factor – A factor expressing deviation of a gas from perfect gas laws. For practical purposes, at the pressures and temperatures normally encountered in **AIR** compressors, air can be considered to follow the perfect gas laws.

Temperature, absolute – See Absolute Temperature.

Temperature, critical – See Critical Temperature.

Vacuum pump – A compressor that operates at an intake pressure below atmospheric and usually discharges at atmospheric pressure or a little higher.