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AERONAUTICAL RECOMMENDED PRACTICE

ARP 147B

NOMENCLATURE, AIRCRAFT AIR CONDITIONING EQUIPMENT

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1. ADIABATIC	Adiabatic describes a process in which an energy change is accomplished on or by a fluid without heat transfer to or from the surroundings.
2. AIR, BLEED	Air bled from the compressor of a gas turbine engine.
3. AIR, CABIN	a. Air flowing into the cabin. b. Air in the cabin proper - the condition of cabin air is normally determined at the point where the air leaves the cabin.
4. AIR, COOLING	A stream of air used as a heat sink.
5. AIR, RECIRCULATED	A quantity of air previously supplied to an aircraft cabin and recirculated within this space by fans or blowers.
6. AIR, STANDARD SEA LEVEL	Standard sea level air is defined as air at 59°F and at a dry air pressure of 29.92 in.Hg. absolute.
7. ALTITUDE, EQUIVALENT OR CABIN	I.C.A.O. (International Civil Aviation Organization) standard altitude at which atmospheric pressure is equal to the cabin pressure.
8. ALTITUDE, PRESSURE	The altitude corresponding to a given pressure in I.C.A.O. standard atmosphere.
9. ALTITUDE, STANDARD	The altitude corresponding to the temperature and pressure as defined for an I.C.A.O. Day and as tabulated in NACA-TN-3182.
10. ANTICIPATOR	A sensitive element in a control system designed to respond to a change in pressure or temperature or rate of change and to reset on the pressure or temperature controlling instrument to counteract the tendency of the controlling system to hunt.
11. AREA, POSITIVE PRESSURE	Any region in which the static pressure is greater than that of the static pressure of the undisturbed air stream.

12. AREA, NEGATIVE PRESSURE	Any region in which the static pressure is less than that of the static pressure of the undisturbed air stream.
13. ATMOSPHERE, STANDARD	The atmosphere as defined in NACA-TN-3182 for an I.C.A.O. Day.
14. BOILER	That part of an air conditioning system, a heat exchanger, in which a source of heat is utilized to vaporize a liquid heat transfer medium. (See EVAPORATOR).
15. BULB, THERMOSTATIC	A liquid-vapor filled bulb wherein pressure changes are proportional to temperature changes. It is used as a means of control.
16. CABIN, NONPRESSURIZED	An airplane cabin which is not designed or equipped for pressurizing.
17. CABIN, PRESSURIZED	An airplane cabin which is constructed, sealed, and equipped with an auxiliary system to maintain a pressure within the cabin greater than that of the surrounding atmosphere.
18. CAPILLARY TUBE	A small diameter tube connecting a thermostatic valve with a bellows or diaphragm in a control device. Also it is a small diameter tube used as an expansion valve in small refrigeration systems.
19. CENTRIFUGE	A device which utilizes centrifugal force to separate materials of differing densities, such as water droplets or impurities from air.
20. CHARGE, REFRIGERANT	The amount and type of refrigerant contained in a system.
21. COEFFICIENT OF PERFORMANCE (COP)	Pertaining to a refrigeration cycle, COP is the ratio of refrigeration produced to the work supplied, where refrigeration produced and work are expressed in consistent units.
22. COMPRESSOR	A device in which work is done on a fluid to raise its total pressure.

23. COMPRESSOR, AXIAL	A compressor which inducts and delivers a fluid axially by one or more rotating elements, compressing the fluid.
24. COMPRESSOR, CABIN	A compressor which compresses and delivers air to a pressurized cabin.
25. COMPRESSOR, CENTRIFUGAL	A compressor which inducts a fluid axially, delivers it radially outward relative to the rotating impeller, and compresses the fluid.
26. COMPRESSOR, LYSHOLM TYPE	A positive displacement lobe-type compressor with internal compression.
27. COMPRESSOR, POSITIVE DISPLACEMENT	A compressor which compresses the fluid by mechanical displacement.
28. COMPRESSOR, RECIPROCATING	A positive displacement piston-type compressor.
29. COMPRESSOR, ROOTS-TYPE	A positive displacement lobe-type compressor without internal compression.
30. COMPRESSOR, VANE	A positive displacement compressor of the vane type.
31. CONDENSER	A heat exchanger in which the state of a fluid is changed from a gas or vapor to a liquid.
32. CONDUCTANCE, AIR SPACE	The heat transfer coefficient of an air space which includes the combined influence of conduction, convection, and radiation for a specified air space width. Its units are usually expressed in BTU/Hr-Ft^2-°F.
33. CONDUCTIVITY, THERMAL	The physical property of a substance which denotes the unit heat transfer rate by conduction through the substance usually expressed in units of BTU/Hr-Ft^2-°F/Ft.
34. CONTROL, AUTOMATIC	A control device that automatically regulates some part of an air conditioning system by electrical, hydraulic, pneumatic, or mechanical means.
35. CONTROL, BAROMETRIC	A method of control which depends on the barometric pressure of the atmosphere.

36. CONTROL, DIFFERENTIAL PRESSURE	A method of control which limits the maximum pressure differential between cabin pressure and atmospheric pressure and maintains this differential at all altitudes above those of the isobaric control. When operating the differential control always overrides the isobaric control.
37. CONTROL, ISOBARIC	A method of control which maintains essentially constant cabin air pressure.
38. CONTROL, MANUAL	A control device regulated by hand.
39. CONTROL, MODULATING	A continuous automatic regulating type of control.
40. CONTROL, PRESSURE RATIO	a. A method of control which limits the maximum pressure ratio between cabin pressure and atmospheric pressure and maintains this ratio at all altitudes above those of the isobaric and differential controls. b. A control which operates to maintain a specific pressure ratio between two points in a system.
41. CONDITIONING, AIR	The simultaneous control of all, or at least the first three, of the following factors affecting both the physical and chemical conditions of the atmosphere within a structure: temperature, humidity, motion, distribution, pressure, dust and bacteria.
42. CONDITIONING, PREFLIGHT AIR	The process of air conditioning an aircraft cabin while the aircraft is on the ground.
43. COOLING LOAD, CABIN	The heat transfer rate to the cabin air as measured by the difference between the total enthalpy of the air discharged from the cabin and the total enthalpy of the air entering the cabin.
44. COOLING LOAD, TOTAL	The heat transfer rate from the cabin air supply as measured by the difference between the total enthalpy

	of the air entering the cooling device or devices and the total enthalpy of the air leaving the cooling devices.
45. COOLING SYSTEM, BOOTSTRAP	A turbine cooling system in which the cabin air stream flows from a pressure source successively through a secondary compressor, a heat exchanger, and a turbine. Cooling air flows through the heat exchanger due to ram pressure. The power necessary to drive the secondary compressor is obtained from the turbine.
46. COOLING SYSTEM, REDUCED AMBIENT	A turbine cooling system incorporating two turbines in which the cooling air passes first through a turbine then through the heat exchanger in which it is used to cool the cabin air and then through a compresser which raises its pressure up to ambient pressure. Power from both the cooling air turbine and the cabin air turbine is used to drive a cooling air compressor.
47. COOLING SYSTEM, REGENERATIVE	A turbine cooling system in which the cabin air flows from a pressure source successively through a heat exchanger and a turbine. From the turbine a portion of the air goes to the cabin and the balance is used as cooling air in the heat exchanger. Power from the turbine is used to drive the cooling air fan.
48. COOLING SYSTEM, SIMPLE	A turbine cooling system composed of a heat exchanger followed by a turbine in the cabin air stream and the same heat exchanger followed by a fan or compressor in the cooling air stream. Power from the turbine is used to drive the cooling air fan.
49. CRITICAL POINT	The critical point of a fluid is that point at which the liquid and the vapor have identical properties; critical temperature, critical pressure and critical volume are the terms given to the temperature, pressure and volume at the critical point. Above the critical temperature gas can not be liquefied by pressure alone. Critical pressure is saturation pressure corresponding to critical temperature.

50. CYCLE, CLOSED	A closed cycle is one where the working substance is returned regularly to a particular state or condition at each point in the cycle during steady operation.
51. DAMPER	A device for controlling air flow.
52. DECIBEL	The decibel is a logarithmic scale unit of sound and is described as: the sound intensity I_1 is N decibels higher in "intensity level" than the reference sound intensity I_o if N = 10 $\log_{10} I_1/I_o$. The reference intensity level is usually taken as 1.0 X 10^{-16} watts/cm^2.
53. DENSITY, MASS	The mass of any substance per unit volume. The standard mass density of dry air is 2.378 x 10^{-3} slugs/Ft^3 at 59° and 29.92 in.Hg. absolute.
54. DIFFUSER	A device for converting the velocity pressure of a fluid stream into pressure head, usually accomplished by efficiently reducing the velocity of air.
55. DISTRIBUTION SYSTEM	The combination of ducts, cabin inlet openings and individual air inlet vents which distribute conditioned supply air to the cabin.
56. DRYER	A device used to remove water or water vapor from a refrigerant or other fluid.
57. EFFECTIVENESS, HEAT EXCHANGER	a. Coolers The temperature drop of the hotter fluid divided by the maximum temperature drop theoretically obtainable through the use of infinite heat transfer surface. b. Heaters The temperature rise of the cooler fluid divided by the maximum temperature rise theoretically obtainable through the use of infinite heat transfer surface.

58. EFFICIENCY, ADIABATIC

a. Turbines
The ratio of the actual dry air enthalpy drop through a turbine to the enthalpy drop for a reversible adiabatic expansion.

b. Compressors
The ratio of enthalpy rise of dry air in a compressor for a reversible adiabatic compression to the actual air enthalpy rise.

59. ENTHALPY

Property of substance in an energy term defined as follows:

$$h = u + \frac{PV}{J} \text{ BTU per lb.}$$

where: u = internal energy
P = pressure
V = volume
J = mechanical equivalent of work

If the fluid can be regarded as a perfect gas, its enthalpy can alternately be expressed as the product of its constant pressure specific heat and its absolute temperature.

60. EVAPORATOR

As pertains to a refrigeration system, that part of the system in which heat is transferred to the refrigerant resulting in its change of phase from a liquid to a gas. (See Boiler).

61. EXHAUST SYSTEM (VENTILATING)

As relates to cabin ventilation, that combination of air discharge ducts, vents and outlet grills utilized for the discharge of air from the cabin to the outside.

62. FILTER, AIR

A device for removing dust or other foreign particles from air.

63. FLAME-RESISTANT MATERIALS

To be obtained from latest revision of CAR 04b.

64. FLASH-RESISTANT MATERIALS

To be obtained from latest revision of CAR 04b.

65. FIREPROOF MATERIALS

To be obtained from latest revision of CAR 04b.

66. FIRE-RESISTANT MATERIALS	To be obtained from latest revision of CAR 04b.
67. FLOW, VOLUMETRIC	The volume rate of fluid flow at a specified temperature and pressure, usually expressed in units of Ft^3/min.
68. FLOW, WEIGHT	The weight rate of fluid flow, usually expressed in units of lbs/min.
69. HEAT EXCHANGER	An apparatus in which the transfer of heat from one medium to another is accomplished without mixing of the media.
70. HEAT EXCHANGER, CABIN PRESSURIZING PRIMARY (AFTERCOOLER)	A heat exchanger designed to reduce the temperature of air discharged by a cabin air compressor.
71. HEAT SINK	Any medium which is the ultimate receiver of energy being transferred as heat.
72. HEAT TRANSFER COEFFICIENT, OVERALL	The single coefficient which describes the heat transfer rate through the section under consideration. It is the combination of all the individual heat transfer paths through the section and is usually expressed in units of $BTU/Hr\text{-}Ft^2\text{-}^\circ F$.
73. HEAT TRANSFER COEFFICIENT, SURFACE OR FILM	The conductance of the thin layer of fluid immediately adjacent to the surface and is usually expressed in units of $BTU/Hr\text{-}Ft^2\text{-}^\circ F$.
74. HEATER, CABIN	A heat exchanger, usually employing combustion gases, compressed air, or electrical energy, from which heat is transferred to the cabin air supply.
75. HEATER, EXHAUST HOT AIR TYPE	An exhaust hot air type heater, as used for airplane heating, is one that utilizes, by means of a heat exchanger, the heat of the exhaust gases from the engine for the purpose of directly heating the air supplied to the airplane.

76. HEATER, INTERNAL COMBUSTION TYPE	An internal combustion type heater is one that utilizes the heat produced by combustion of a fuel within the heater itself.
77. HEATER, MUFF TYPE	A heater designed to surround the duct or pipe carrying the engine exhaust gases. Heat will, in this way, be transferred to air passed through the annular space between the exhaust pipe and the muff.
78. HEATER, RADIANT	A device which accomplishes heating by means of direct radiation.
79. HEATER, SHROUD	Synonymous with MUFF HEATER.
80. HEATING LOAD, CABIN	The rate of heat transfer to the cabin as measured by the difference between the total enthalpy of air entering the cabin and the total enthalpy of the air leaving the cabin.
81. HEATING LOAD, TOTAL	The rate of heat transfer to the cabin air supply as measured by the difference between the total enthalpy of the air leaving the heating system and the total enthalpy of the air entering the heating system.
82. HUMIDITY, RELATIVE	The ratio of the partial pressure of water vapor in the air to the partial pressure which saturated water vapor exerts at the same air temperature.
83. HUMIDITY, SPECIFIC (HUMIDITY RATIO)	The weight of water vapor in air expressed in pounds or grains of water vapor per pound of dry air.
84. HUNTING	A term applied to the undesirable oscillation of a control device resulting in a poor degree of control.
85. INDUCTION SYSTEM (VENTILATING)	That combination of scoops and ducts which introduce outside air to the air distribution equipment of the airplane.
86. INLET, AIR	Air inlets through which air is supplied to the space to be conditioned.

87. INTENSIFIER TUBE	An intensifier tube, as commonly applied to heating, refers to a tube which passes within the ducts or pipes carrying engine exhaust gases. Such a tube is designed to transfer heat from the exhaust gas to the air flowing within the tube.
88. INTERCOOLER, CABIN PRESSURIZING	A heat exchanger designed to reduce the temperature between two stages of air compression.
89. ISOTHERMAL REGION	A region of constant temperature.
90. LIQUID RECEIVER, VAPOR CYCLE	A vessel permanently connected to a system used for the storage of liquid refrigerant.
91. LIQUID TRANSPORT SYSTEM	A system for extracting heat at one location and rejecting it at another location. Such a system usually consists of a coolant, a coolant reservoir, a recirculation pump, and heat exchangers.
92. NOZZLE AREA, EFFECTIVE	A theoretical area of a nozzle throat which is the product of its geometric area and a dimensionless nozzle discharge coefficient.
93. OUTLET, AIR	Openings through which air is removed from the space being conditioned.
94. PRESSURE, PARTIAL	That portion of the static absolute pressure of a mixture of gases, attributable to one gaseous component.
95. PRESSURE, (DIFFERENTIAL) RAM AIR STATIC (INLET)	The differential between the static pressure within the inlet and the static pressure of the undisturbed air stream.
96. PRESSURE, (DIFFERENTIAL) RAM AIR TOTAL (INLET)	The maximum differential between the total pressure within the inlet and the static pressure of the undisturbed air stream (ambient atmosphere).

97. PRESSURE, STATIC	The pressure that would be measured by a probe having zero velocity relative to the fluid. Pressure measurement taken by the probe normal to the direction of motion of the fluid closely approximates this pressure.
98. PRESSURE, TOTAL	The sum of the static pressure and the dynamic pressure in a fluid system.
99. PRESSURE DIFFERENTIAL, STATIC	The difference between the static pressuresat two points in a fluid system.
100. PRESSURE DIFFERENTIAL, TOTAL	The difference between the total pressures at two points in a fluid stream.
101. PRESSURE DROP, TOTAL NONRECOVERABLE	The loss of total pressure between two points in a fluid stream. (Equal to the total pressure differential).
102. PRESSURE RATIO	The ratio of the absolute pressures of a fluid entering and leaving a device. The order of the pressures is customarily chosen so that the value of the pressure ratio is greater than one. For turbines, inlet total to outlet static pressure is commonly used. For compressors outlet total to inlet total pressure is commonly used.
103. PRESSURIZING, CABIN	Increasing the pressure in a compartment above that of ambient pressure and controlling the pressure in said compartment.
104. PRESSURE RISE, DYNAMIC	The maximum static pressure increase developed by the momentum of a fluid stream when its velocity is reduced to zero.
105. PUMP, JET (EJECTOR)	A device which raises the pressure of a substance by entraining it with a high velocity jet of the same or a different substance and giving the resultant mixture a relatively high velocity. The static pressure of the mixture is then raised by a deceleration process in combination with, in most cases, a pressure shock.

106. REFRIGERANT	The medium of heat transfer in a refrigerating system which picks up heat by evaporating at a low temperature and pressure and gives up heat by condensing at a higher temperature and pressure.
107. REFRIGERATION CYCLE	The complete course of operation of a refrigerant back to a starting point, evidenced by: a repeated series of thermodynamic processes, or flow through a series of apparatus, or a repeated series of mechanical operations.
108. REFRIGERATION SYSTEM, AIR CYCLE	A system which uses air as a refrigerant and supplies this air to the compartment to be cooled.
109. REFRIGERATION SYSTEM, VAPOR CYCLE	An assembly of connected components usually consisting of an evaporator, expansion valve, compressor, condenser, and control elements through which a refrigerant is circulated for the purpose of extracting heat at a low temperature level and rejecting it at a high temperature level.
110. REFRIGERATION SYSTEM, COMPOUND	A vapor refrigeration cycle using two or more stages of compression.
111. REFRIGERATION SYSTEM, CASCADE	A vapor cycle refrigeration system having two or more refrigerant circuits, each containing a compressor, condenser, and evaporator. The evaporator of one circuit cools the condenser of the other circuit.
112. REGULATOR, CABIN PRESSURE	a. A pressure regulator valve from a pressurized cabin which regulates the pressure in that cabin by controlling the outflow of air from the cabin. b. or valve at the air supply to the cabin regulating flow to the cabin in order to maintain prescribed pressure.
113. REGULATOR, CABIN PRESSURE AUXILIARY UNIT	A unit containing all the parts of a cabin pressure regulator but the control elements and operated in parallel with and by cabin pressure