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NOMENCLATURE, AIRCRAFT HYDRAULIC AND PNEUMATIC SYSTEMS

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1. **INTRODUCTION** - The purpose of this nomenclature guide is to promote more uniform and specific nomenclature throughout the airframe industry. Terms listed and defined are applicable to parts, aspects and characteristics of aircraft hydraulic and pneumatic fluid power systems and their components.

Usage of nomenclature, where practicable, which conforms to definitions contained herein will serve to promote clarity and avoid misunderstanding. Some recommendations are made for restriction of terms which have become somewhat ambiguous or are considered less desirable than recommended nomenclature. Use of terms not defined herein is recommended only where those contained herein may not be applicable or adequate.

No recommendation is intended as to restriction of use of other vocabulary, as appropriate, in descriptive literature or textbooks.

Definitions are arranged alphabetically under sections as follows:

2. **BASIC DEFINITIONS AND STANDARD TERMINOLOGY**
3. **VALVE DESCRIPTION AND ATTRIBUTES**
4. **STANDARD MARKINGS**

2. **BASIC DEFINITIONS AND STANDARD TERMINOLOGY**

ACCUMULATOR - A closed container for pressure storage of fluid energy.

Accumulator, Compensating - An accumulator which, in addition to its high pressure volume, incorporates low pressure volumetric capacity which will accommodate a like volume of fluid to that discharged from the high pressure chamber. The sum of the volumes of the high and low pressure chambers remains constant.

Accumulator, Cylindrical - An accumulator in which the fluid is separated from the compressible medium by means of a piston operating in a cylindrical container.

Accumulator, Flexible Separator - An accumulator in which the fluid is separated from the compressible medium by means of a flexible bladder or diaphragm.

Accumulator, Hydraulic - An accumulator in which the stored operating medium is hydraulic fluid.

Accumulator, Hydro-Pneumatic - An accumulator in which the stored operating medium is hydraulic fluid, pressurized by means of compressed gas.

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ACTUATOR - A device for converting fluid energy into mechanical energy.

Actuator, Hydro-Mechanical - A hydraulically actuated mechanism which incorporates mechanical linkage for modification of output.

Actuator, Rotary - A device for converting fluid energy into mechanical energy in the form of rotary motion which is limited in angular travel, as distinguished from a motor which can produce continual rotation.

Actuator, Servo - An integral servo valve and hydraulic actuator for use in a control system.

BARREL - A cylindrical component of an actuating cylinder, accumulator, etc. in which a piston or sealed separator moves.

CHOKE - A flow restriction in which the length of the reduced area passage is of sufficient magnitude that fluid viscosity becomes of major importance in determining pressure drop.

CLOSED CENTER - In a hydraulic system, when no service is actuated the system is closed to flow, as distinguished from an open center system. A closed center system may utilize a continuous pressure supply, as with a variable displacement pump, or an intermittent pressure supply by means of unloader valve, motor driven pump or pump by-passing provisions.

CONNECTOR - Not recommended, except to describe provision for an electrical connection; see FITTING.

CYLINDER, ACTUATING - (Sometimes called "Jack", "Ram" or "Strut") - A linear motion device in which the thrust or force is proportional to the effective cross-sectional area and the pressure differential.

Cylinder, Balanced - An actuating cylinder in which the effective thrust producing area is equal in both directions.

Cylinder, Double Acting - A cylinder with provisions for applying fluid pressure at each end, and thus capable of exerting a force in either direction.

Cylinder, Fixed End - A cylinder which is held in a rigid position.

Cylinder, Flight Control - An actuating cylinder designed for in flight actuation of aerodynamic surfaces.

Cylinder, Rotating End - A cylinder mounted to permit limited rotary movement about a fixed point.

Cylinder, Single Acting - A cylinder in which fluid pressure is introduced in one end so that fluid force is exerted in one direction only. Gravity, spring forces, or other means are used to accomplish the return stroke.

Cylinder, Swivel End - A cylinder with one or both ends provided with a joint which not only allows oscillation of the cylinder but which also incorporates stationary fluid connections.

Cylinder, Transfer - A device for transmitting fluid pressure from one circuit to another without intermixture of fluid between the circuits.

DASHPOT - A snubbing device within a fluid operated unit which operates at the extremity of the stroke by displacing operating fluid through a restricted passage, as sometimes used in an actuating cylinder.

FILTER - A device serving to remove solid particles from a flowing fluid by passing it through a porous element.

Filter, Line Type - A filter designed for installation in a fluid line and having a case capable of withstanding the operating pressure of the line, usually system pressure.

Filter, Reservoir Type - A filter to be housed within the shell of a reservoir for purification of the return flow to the reservoir, usually applied to the filter element alone.

Filter, Vent Type - A filter for installation in an atmospheric vent line.

FITTING - Not recommended, except in relation to fluid passage attaching devices of the nature used external to operating components; see FITTING, TUBE.

Fitting, Tube - A self-contained detachable device including a fluid passage for attaching or connecting fluid carrying lines.

FLIGHT CONTROL COMPONENT - (Actuator, Cylinder, Valve, etc.) - A component used in a system controlling in flight actuation of aerodynamic surfaces.

FLOW - Rate of fluid movement, usually expressed in GPM.

Flow, Calibrated - In a unit which controls or limits rate or quantity of flow, that rate or quantity of flow for which the unit is calibrated or adjusted. When calibration is related to specific conditions, the condition of calibration must be stated. Example, a restrictor may be calibrated to pass 1 GPM at 1500 psi pressure differential.

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Flow Proportioner - A device which automatically maintains a relatively constant ratio between the portions of dividing or combining flow passing through it regardless of differences in pressure between the portions. A flow proportioner may operate only with combining flow, dividing flow or with both.

Flow Divider - A flow proportioner which operates only with dividing flow.

Flow Equalizer - A flow proportioner in which the portions are equal.

Flow, Rated - The nominal maximum operating flow, applicable where control of that flow rate is not basic. Example, a one way restrictor valve with a calibrated flow of 1 GPM at 1500 psi pressure differential may have a rated flow of 3.5 GPM in the reverse or free flow direction.

FLUID, OPERATING - The medium or fluid to be used in a unit or system.

FOUR-WAY - Not recommended; see VALVE, DIRECTIONAL CONTROL.

FUSE - A device which automatically shuts off flow in a line in event of downstream system rupture.

Fuse, Quantity Measuring - A fuse which closes when more than a predetermined quantity of fluid has passed through it.

Fuse, Return Flow - A fuse which closes both pressure and return lines when the ratio between the flows deviates beyond a predetermined value.

GASKET - The flexible sealing element in a stationary or static fluid seal.

GLAND - The cavity or space provided for the accommodation and operation of an elastic packing or gasket for sealing of a fluid vessel or compartment.

INTENSIFIER - A device which converts an input pressure to a higher output pressure which is proportional to its input pressure.

LEAKAGE - Flow through a passage which is in a nominally closed position or at a location which normally should permit no flow, usually of relatively small magnitude.

LINE - A tube, pipe or hose which acts as a conductor of fluid.

Line, Bleed - A line, selectively open to overboard, which serves only for removing foreign substances from a system or unit, as for removal of entrapped air from a hydraulic circuit.

Line, Drain - A line returning leakage fluid independently to reservoir or return circuit. Also, a line selectively open to overboard for removing fluid from the system.



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Line, Pilot - A line which acts as a conductor of control actuating fluid.

Line, Pressure - A line which conducts fluid from the pressure source to a control unit or units.

Line, Return - A line which conducts working fluid back to the reservoir.

Line, Supply - A line which conducts a fluid supply, as from a reservoir to a pump.

Line, Vent - A line which is continuously open to atmosphere.

MOTOR, HYDRAULIC - A device for converting liquid fluid energy into mechanical energy in the form of continual rotary motion of a mechanical member.

ONE-WAY - Not recommended, except as a modifier of such items as restrictor valves.

OPEN CENTER - In a hydraulic system, when no service is actuated the system is open to flow, completing the circuit through the control units back to reservoir. An open center system will normally employ a fixed displacement pump.

ORIFICE - A short fluid passage which produces a substantial reduction in flow by virtue of its cross-sectional area. A true orifice has zero length.

PACKING - The flexible sealing element in a fluid seal which is subject to sliding motion.

PATTERN, FLOW - The paths of fluid flow connecting various ports in a given valve position.

PISTON - A cylindrical part which slides in a cylinder or barrel and serves to transfer force to or from the enclosed fluid.

PISTON ROD - A coaxial column or rod, attached to or integral with a piston, which serves to transmit force between the piston and another mechanical member.

PORT - An opening at a surface of a component incorporating provisions for attachment of a fluid carrying passage, line, fitting or removable plug.

POSITION, VALVE - The position of the valve mechanism which determines the flow pattern.

PRESSURE - Normally used as a modifier to designate a portion of a system or unit which is normally exposed to system pressure. The term "pressure" is considered to mean gage pressure, as defined below, except where otherwise specified.

Pressure, Absolute - True pressure, as related to a complete vacuum.