

Technical Data/Glossary of Terms

1. Applications

[Process Gas]

A generic term describing gases used in manufacturing which contact the product being manufactured (processed).

[Specialty Gas]

A generic term describing gases stored in cylinders (bottles). These gases range from non-hazardous inert to hazardous - corrosive, poisonous, flammable, oxidizer and pyrophoric.

[Bulk Gas]

A generic term used to describe gases stored in large vessels. The most common bulk gases are stored in liquid phase, such as nitrogen and oxygen.

[CDA]

Clean dry air, generally supplied by a compressor rather than a cylinder (bottle).

[Ultra High Purity (UHP)]

A term common to the semiconductor industry and other clean industries such as solar, LED and flat panel display, used to describe extremely high purity and very low contamination requirements. Gases are of the highest level of purity attainable and gas handling systems and components are designed to maintain such purity without contributing contamination to the gas stream.

[General Applications]

This term indicates all industries other than semiconductor and clean industries such as solar, LED and flat panel display, and applications that are not UHP.

[Source (Cylinder) Applications]

Defines products used at gas storage vessel, such as a cylinder (bottle) pressure regulator used to decrease source pressure to a lower line pressure. For the purposes of this catalog, components are defined as 'source' if they are the cylinder pressure regulator or upstream of the cylinder regulator.

[Distribution Applications]

Defines products used downstream of source regulator which includes point of use, distribution panels such as valve manifold boxes (VMB) and within the process tool. For the purposes of this catalog, components downstream of the source regulator are defined as 'distribution'.

[Bulk Gas Applications]

Defines products used for source and distribution applications of bulk gases, including BSGS (bulk specialty gas systems).

[Sub-atmospheric Applications]

Source and distribution applications where pressure delivery is less than atmospheric pressure. This is common for low vapor pressure specialty gas delivery.

2. Products

[Regulator]

A control valve that works by reducing the valve inlet pressure and delivering a lower outlet pressure. Most AP Tech regulators are non-relieving type, which means pressure above set point is not vented automatically.

[Single stage]

Single stage pressure regulators drop pressure only once in a single step.

[Two stage]

Two stage regulation drops pressure twice, in two steps. A two stage regulator is simply two regulators in series with a common body. Two stage regulations are two separate regulators in series.

[Tied-diaphragm]

This is a regulator design in which the diaphragm and poppet are linked together. The tied diaphragm feature pulls the poppet closed as the pressure rises above set point and stops leak due to contamination or some other failures.

[Springless Regulator]

These are pressure regulators which do not have wetted springs below the poppet. The diaphragm and poppet are linked, as with the tied diaphragm, but it is also does not have a poppet spring.

[Back pressure regulator]

This is a control valve that if the pressure on the inlet side exceeds a set level, the over pressure is vented to outlet side to keep the inlet pressure stable.

[Diaphragm valve]

This is a shut off valve which uses a diaphragm for a moving element to open and close the valve. Springless diaphragm valves do not have a wetted spring. Diaphragm valves from AP Tech are two way valves, available with multiple ports.

[LOTO]

Stands for Lock-out/Tag-out and is used to ensure worker's safety.

Lock-out refers to physically locking the device to shutoff gas supply to equipment. Tag-out refers to the practice of attaching a warning tag to the device to prevent potential accidents caused by erroneous operations.

[Purge port]

Purge ports can be located on the inlet and/or outlet side of the valve. It can be used in applications, such as applying purge gas when welding on the line or maintenance service while valve is closed.

[Check valve]

A check valve is a safety device intended to prevent reverse flow. The AP 64 is a unique design with only one moving part in the gas stream, an O-ring. It is a springless design, free of springs and poppets.

[Vacuum generator]

A venturi device that creates vacuum by flowing gas through a nozzle. The AP 71 and 72 are module devices which combine a supply valve and check valve with the venturi.

[Constant bleed]

A feature that provides a continuous flow of gas through the valve via an orifice when it is closed. This feature is used with the AP 71 and AP 72 series to keep exhaust lines inert. It is also available as an option to certain standard shut off valves to provide a bleed to keep the cylinder connection inert while disconnected from a cylinder.

[Flow switch]

A sensor that detects excess flow above a given flow rate, caused by pipe breakage etc.

Note that the AP 4 and AP 74B series are simple switches and do not have a flow rate display function.

3. Materials

[316 SS]

An austenitic stainless steel with a higher nickel content to improve its corrosion resistance.

[316L SS]

A low-carbon form of 316 SS which has better intergranular corrosion resistance than 316 SS.

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[316L SS secondary remelt]

A high-grade form of 316L SS to reduce impurities to the utmost limit.

AP Tech 316L SS secondary remelt steel conforms to the SEMI standard F20 UHP grade.

[Ni-Cr-Mo alloy]

A nickel-chromium-molybdenum alloy with excellent corrosion resistance.

[Ni-Co alloy]

A cobalt-chromium-nickel alloy with excellent corrosion resistance and superelasticity. This material is used as diaphragm of the diaphragm valves.

[PCTFE]

Poly Chloro Tri Fluoro Ethylene. This is high transparency fluoroplastic material with mechanically superior in rigidity and excellent low temperature. This material is used as standard seat material of the regulators and diaphragm valves.

[PTFE]

Fully fluorinated material. This is virtually chemically inert. PTFE should have equivalent or superior chemical compatibility compared to PCTFE in every application. PTFE (TF) option available for the AP 500, AP, AZ & AK 1000 & 1100 and AZ & AK 1300. The primary application for this material is for pressure regulators inside process tools.

[Polyimide]

Plastic with excellent heat resistance (polyimide resin). This material has excellent heat and wear resistance. This seat is available as an option for high temperature applications or specific gas applications, such as N₂O or CO₂.

[PEEK]

Polyetheretherketone. This material has excellent heat, fatigue and chemical resistances as thermoplastic resin. This seat is available as an option for the regulators.

[FKM]

Fluoro-rubber (FKM). This material has excellent heat and chemical resistances.

[FFKM]

Perfluoroelastomer (FFKM). This material has excellent heat and chemical resistances compared to fluoro-rubber (FKM).

4. Surface treatment

[Electropolish]

Commonly referred to as EP, is an electrolytic process for metals to enhance a surface chemistry and smooth the surface finish.

[Passivation]

A process for metals to form a passivation layer on the surface, typically by removing surface Fe in a nitric acid bath.

5. Connections

[Face seal fitting]

A fitting type in which a metal gasket effects a seal with mating fittings, forming high leak integrity, metal to metal seal. The most common face seal fitting is VCR[®] compatible type.

[Tube weld]

Components with tube stubs are installed by welding into the piping system directly without using fittings.

[Compression fitting]

A self-aligning tube fitting that uses a ferrule to compress on the tubing effecting a seal when the nut is tightened. A common compression fitting is that of Swagelok[®].

[NPT]

A tapered pipe thread which is a U.S.A standard (ANSI).

6. Specifications

[Surface finish Ra]

Surface finish of the inner surface (wetted parts). A standard for measuring surface roughness which averages the peak to valley of the surface profile over a given distance (stroke). Multiple readings on a part are also averaged for Ra, but for Ra max, the worst reading is the value for that part.

[Cv factor]

The flow coefficient, Cv, is defined as the volume of 15.6°C water passing through a valve with specific differential inlet to outlet pressures. Cv is calculated in accordance with the SEMI standard F32. Cv measurements of regulators are taken with the orifice of the regulators wide open.

[Cracking pressure]

This is the pressure at which a check valve first opens and achieves a given flow rate as pressure increase.

[Ultimate vacuum]

The maximum vacuum generated by a vacuum generator.

[slpm]

Abbreviation for standard liter per minute. Indicates the volumetric flow in liters per minute of time at standard conditions of a temperature of 0°C and a pressure of 1 atmosphere.

[Supply pressure effect]

The change in a pressure regulator's outlet pressure resulting from a change in source (supply) pressure. The most typical is an increase in outlet pressure as the inlet pressure decays – often stated as a given rise per a given drop in pressure.

[Inboard leakage]

Leakage rate from outside to inside of the products occurring when an internal pressure is less than the external pressure. This can be detected by spraying helium on outside of the products and detecting helium entering into the products from any leak path while internal cavities are evacuated. This detection method conforms to the SEMI standard F1.

[Outboard leakage]

Leakage rate from inside to outside of the products occurring when an internal pressure is more than the external pressure. This can be detected by pressurizing helium inside the products and detecting helium leaking outside from the products. This detection method conforms to the SEMI standard F1.

[Across the seat leak]

Leak rate from inlet to outlet of a device in the closed position. Often also referred to as 'internal leakage' meaning leak is only internal from inlet to outlet side.

[SEMI standards]

Voluntary standards issued by Semiconductor Equipment and Materials International (SEMI) an international industry association made up of companies that supply manufacturing equipment, materials and related services to the semiconductor, flat panel display, nanotechnology, MEMS, solar power generation and other related industries.