

Regulator and Valve Selection Guide

Valve and Regulator Recommendations

for source and distribution application

This guide is a reference guide to help customers determine an appropriate AP Tech valve and regulator to be used in process gas systems. Before selecting a product, please make sure to read through this guide. For information and specifications related to the specific model, please refer to the catalog data sheet.

Precautions for selection

This guide's general recommendations are based upon typical applications and conditions. The proper regulator selection can be significantly affected by parameters such as system design, flow duration, frequency of use, ambient conditions and outlet pressure. It is important to understand that one may follow this guide's recommendation, yet have a failure due to a parameter specific to the given application, as noted. Restated, one may achieve higher or lower flow capacities than stipulated in this guide due to the parameters and conditions of a specific application and system design.

- **Source valves** are those on the upstream side of the pressure regulator in the source gas cabinet or bulk delivery system.
- **Distribution valves** are those on the downstream side of the pressure regulator in the source gas cabinet or bulk delivery system and used anywhere downstream of the regulator (s) for cylinder applications at point of use (POU) in valve manifold boxes (VMBs) and process tools.
- **Source regulators** are those used in the source gas cabinet or bulk delivery system.
- **Distribution regulators** are those used at point of use (POU) in valve manifold boxes (VMBs) and process tools. Recommendations are based on typical usage. Operating practices at a specific facility may require a different component selection.
- It is assumed that non-liquefied gas cylinders are switched over to a new cylinder when the pressure drops to 150 to 250 psig (1.0 to 1.7 MPa). Therefore, maximum recommended flow rates for source regulators and source valves assume 150 to 250 psig (1.0 to 1.7 MPa) inlet pressure for this gas.
- It is assumed that the cylinder pressure for liquefied gas systems is maintained at or above the vapor pressure at 16 °C. It is assumed that cylinders are switched over before the liquid is all vaporized into gas. Therefore, maximum recommended flow rates for **source regulators** are based on 16 °C vapor pressure at the regulator inlet for these gases.
- Absolute or very low positive pressure delivery bear close scrutiny. The AP1402TA delivers both sub-atmospheric and positive pressure (30 psig) equally well, whereas the AP1101 is strictly intended for sub-atmospheric pressure delivery (10 psig or less). If low flow and very low positive pressure delivery is desired, the AP1001 should be selected instead of the AP1101. The alternative is to select the AP1402TA which provides more flow capacity and the ability to delivery sub-atmospheric and positive pressure.
- The SHP option is for certain point of use applications in lieu of the SH option. The SHP designation provides

Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas the SH option includes the nozzle.

- If a source regulator is listed as ① and ②, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.
- Valve recommendations are based on typical cylinder pressures and delivery line pressures. Pressure drop across valves at low pressures may be excessive and required a different valve selection.
- Valve recommendations are for the process line isolation. Purge and vent valves are not addressed in this document but generally an AP3000, AP3650, or AP3540 valve will provide sufficient flow capability. The valve series recommended were purposely limited for the sake of brevity. The model number indicates the basic size and rating. For example, manually operated valves are noted as AP3650 but an AP3600 or AP3625 would also be appropriate and equivalent selections.
- Polyimide seats are recommended for nitrous oxide (N₂O) and for source applications for carbon dioxide (CO₂) with either continuous flow demand or flow rates in excess of 100 slpm.
- Heating may be required in the source manifold for some gases even when not stated due to duration of flow, ambient conditions, etc. When heating is recommended, appropriate heating method shall be selected depending on gas type. In general, the gas should be heated upstream of the pressure regulator.
- Distribution line pressure is assumed to be 60 psig (0.4 MPa) minimum or typical source pressure whichever is less. If the actual line pressure is higher, then higher flow rates than listed in this guideline can be obtained.

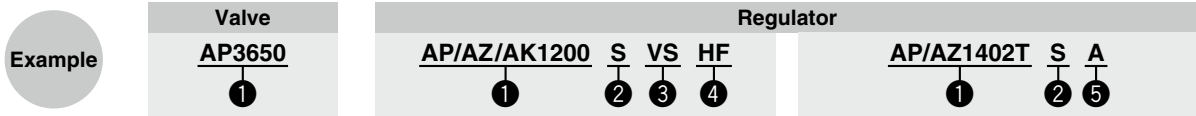
Caution

Since the product specified here is used under various operating conditions, its compatibility with fluid and specific equipment must be decided by the person who designs the equipment or decided its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product regardless of any recommendation. Proper installation, operation and maintenance are also required to assure safe, trouble free performance.

Recommended Model Selection Table

Please read page 32 before selecting a product.

How to read model number listed as recommendation.



1 Series

AP/AZ/AK1200: 3 series are recommended (AP1200, AZ1200, AK1200).

Valve: Only typical series is shown as recommendation and other models with same specifications (operating pressure, Cv) are also recommended.

For example, other than AP3650, AP3600/3625/3657 are also recommended.

2 Material

S: Stainless steel body as standard design.

SH: Stainless steel body with Ni-Cr-Mo alloy internals as it further improves corrosion resistance than S (standard design).

Either SH or SHP can be used with AP series regulators and SHP is used with AZ series regulators. (SHP provides Ni-Cr-Mo alloy internals comprised of the poppet and diaphragm, whereas SH includes the nozzle.)

Material of stainless steel body varies depending on series.

- AP series (except AP9000&9100) ... 316L SS secondary remelt
- AZ series and AP9000&9100 ... 316L SS
- AK series ... 316L SS

3 VS: Seat material is made of Polyimide. (Only for specific series)

No code: PCTFE as standard design.

4 Option (Only for specific series)

- HF: High flow
- FC: Force compensation
- HR: High inlet pressure

5 A: Delivery of sub-atmospheric pressure. (Only for specific series)

For more details, please refer to catalog.

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Acetylene* (C ₂ H ₂)	230	AP3000	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	280	AP3002	45	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650			75	AP/AZ/AK1200S
				AP3700			95	AP/AZ/AK1200S HF
		400	AP3800				AZ/AK1300S	
Air	185	AP3000	90	AP3540	30	AP/AZ/AK1500S	30	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	200	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS
		AP3650		AP4650	800	AP/AZ/AK1200S HR	400	AP/AZ/AK1200S
	550	AP3100		AP3800			600	AP/AZ/AK1200S HF
	475	AP3130	890	AP3700				AZ/AK1300S
	AP3125		AP3800					
Ammonia (NH ₃)	250	AP3540	100	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	450	AP4540	225	AP4540	75	AP/AZ/AK1200S	60	AP/AZ/AK1400TS
		AP4650		AP4650	400	AP/AZ/AK1200S	125	AP/AZ/AK1200S
	1000	AP3113	1000	AP3700	600	AP/AZ/AK1200S HF	250	AP/AZ/AK1200S HF
		AP3125		AP3800	1100	AP9100S		AZ/AK1300S
						500	AP/AZ/AK1200S FC	
						1000	AP9100S	
Argon (Ar)	200	AP3000	80	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	100	AP1900S	25	AP/AZ/AK1000S HF
	350	AP3002	150	AP4540	300	AP1900S HF	50	AP/AZ/AK1400TS
		AP3650		AP4650	1500	AP/AZ/AK1200S HR	100	AP/AZ/AK1200S
	1000	AP3130	800	AP3700			200	AP/AZ/AK1200S HF
		AP3125		AP3800				AZ/AK1300S
						400	AP/AZ/AK1200S FC	
						1000	AP9100S	

* 15 psig (0.1 MPa) maximum source regulator outlet pressure.

■ denotes heating required to achieve stated flow.

Recommended Model Selection Table

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Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Arsine (AsH ₃)	140	AP3540	55	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	40	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	240	AP4540	95	AP4540				
		AP4650		AP4650				
Arsine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S
		AP3650		AP3650	50	AP1900S	50	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	150	AP/AZ/AK1400TS	150	AP/AZ/AK1400TS
		AP3650		AP4650				
Boron Trichloride (BCl ₃)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.4	AP/AZ/AK1101SH
		AP4650		AP4650			6	AP/AZ/AK1402TSA
Boron Trichloride Mix (Nitrogen Balance)	185	AP3000	90	AP3540	15	AP/AZ/AK1500S	15	AP/AZ/AK1000S
		AP3650		AP3650	60	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540			60	AP/AZ/AK1400TS
		AP3650		AP4650				
Boron Trifluoride (BF ₃)	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS
		AP3650		AP4650				
Boron 11 Trifluoride (11BF ₃)	115	AP3000	60	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	145	AP3002	100	AP4540			25	AP/AZ/AK1400TS
		AP3650		AP4650				
Butadiene (C ₄ H ₆)	60	AP4540	60	AP4540	3	AP/AZ1500S	3	AP/AZ1000S
		AP4625		AP4625	40	AP/AZ1400T	5	AP/AZ1000S HF
n-butane (C ₄ H ₁₀)	60	AP4540	60	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4625		AP4625	40	AP/AZ/AK1400T	5	AP/AZ/AK1000S HF
Butene-1 (C ₄ H ₈)	35	AP3540	30	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	65	AP4540	60	AP4540				
		AP4650		AP4650				
Carbon Dioxide (CO ₂)	500	AP3000	75	AP3540	3	AP/AZ/AK1500S	8	AP/AZ/AK1000S
		AP3650		AP3650	75	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	700	AP3002	140	AP4540	150	AP/AZ/AK1200S VS	40	AP/AZ/AK1400TS
		AP3650		AP4650			100	AP/AZ/AK1200S
	2500	AP3113	750	AP3700	500	① AP/AZ/AK1225S VS ② AP/AZ/AK1200S VS HF	160	AP/AZ/AK1200S HF
		AP3125		AP3800	1000	① AP9030S VS ② AP9100S VS	325	AP/AZ/AK1200S FC
						800	AP9100S	
Carbon Monoxide (CO)	185	AP3000	90	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	15	AP1900S	15	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
		AP3650		AP4650				
Carbonyl fluoride (COF ₂)	115	AP3000	60	AP3540	5	AP/AZ1500S	3	AP/AZ1000S
		AP3625		AP3625	25	AP/AZ1400TS	10	AP/AZ1000S HF
	200	AP3625	100	AP4540				
Chlorine (Cl ₂)	75	AP3540	50	AP3540	3	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH
		AP3650		AP3650	50	AP/AZ/AK1400TS	15	AP/AZ/AK1000SH HF
	150	AP4540	100	AP4540	75	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS
		AP4650		AP4650	200	AP/AZ/AK1200SH HF	75	AP/AZ/AK1200SH
	300	AP3113	400	AP3700			125	AP/AZ/AK1200SH HF
		AP3125		AP3800			250	AP/AZ/AK1200SH FC
Chlorine Trifluoride (ClF ₃)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650			6	AP/AZ/AK1402TSA
Diborane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	5	AP1700S	10	AP/AZ/AK1000S
		AP3650		AP3650	225	AP2700S	20	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540				
Dichlorosilane (SiH ₂ Cl ₂)	20	AP4540	20	AP4540	7	AP/AZ1402TSA	1	AP1001S
		AP4650		AP4650			7	AP/AZ/AK1402TSA

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Recommendations

Regulators

AP

SL

AZ

AK

BP

Valves

Diaphragm

AP

AZ

AK

Check

Valves

AP

AZ

AK

Vacuum

Generators

Flow

Switches

Technical Data/

Glossary of Terms

Precautions

Recommended Model Selection Table

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Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Diethyltelluride (Te(C ₂ H ₅) ₂)	70	AP3000	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	5	AP1900S	5	AP/AZ/AK1000S HF
	85	AP3002	60	AP4540	25	AP/AZ/AK1400TS	25	AP/AZ/AK1400TS
		AP3650		AP4650				
Vinylidene fluoride (C ₂ H ₂ F ₂)	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3625		AP3625	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	200	AP3625	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
				AP4625			75	AP/AZ/AK1200S
Dimethylsilane (C ₂ SiH ₆)	14	AP4540	7	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
	150	AP3700	75	AP3700	75	AP/AZ/AK1200S	75	AP/AZ/AK1200S
		AP3800		AP3800				
Disilane (Si ₂ H ₆)	14	AP4540	7	AP4540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP4650		AP4650	7	AP/AZ/AK1402TSA	7	AP/AZ/AK1402TSA
Ethylene (C ₂ H ₄)	380	AP3000	90	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	485	AP3002	160	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650			75	AP/AZ/AK1200S
Fluorine(F ₂)	10	AP3200	10	AP3200	Consult Factory		Consult Factory	
Fluorine Mixtures (10 %, 3.4 MPa) (Nitrogen Balance)	185	AP3000	90	AP3540	5	AP/AZ/AK1500SH	5	AP/AZ/AK1000SH
		AP3650		AP3650	25	AP/AZ/AK1400TS	10	AP/AZ/AK1000SH HF
	225	AP3002	160	AP4540			25	AP/AZ/AK1400TS
		AP3650		AP4650				
Germane (GeH ₄)	10	AP3540	4	AP3540	1	AP/AZ/AK1000S	1	AP/AZ/AK1000S
		AP3650		AP3650	7	AP/AZ/AK1402TSA	7	AP/AZ/AK1402TSA
	18	AP4540	7	AP4540				
		AP4650		AP4650				
Germane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
		AP3650		AP4650				
Halocarbon 12 (CCl ₂ F ₂)	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
						50	AP/AZ/AK1400TS	
Halocarbon 12B2 (CBr ₂ F ₂)	15	AP4540	15	AP4540	5	AP/AZ/AK1400TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650			5	AP/AZ/AK1402TSA
Halocarbon 13 (CClF ₃)	140	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	170	AP3002	70	AP4540			50	AP/AZ/AK1400TS
		AP3650		AP4650				
Halocarbon 13B1 (CBrF ₃)	110	AP3540	35	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	190	AP4540	65	AP4540			50	AP/AZ/AK1400TS
		AP4650		AP4650				
Halocarbon 14 (CF ₄)	10	AP3000	50	AP3540	10	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	40	AP1900S	15	AP/AZ/AK1000S HF
	200	AP3002	100	AP4540	80	AP1900S HF	30	AP/AZ/AK1400TS
		AP3650		AP4650	500	AP/AZ/AK1200S HR	60	AP/AZ/AK1200S
	600	AP3130	500	AP3700			100	AP/AZ/AK1200S HF
		AP3125		AP3800				AZ/AK1300
						250	AP/AZ/AK1200S FC	
						500	AP9100S	
Halocarbon 21 (CHCl ₂ F)	25	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650				AP1001S
							5	AP/AZ/AK1402TSA
Halocarbon 23 (CHF ₃)	115	AP3000	145	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	140	AP3002	250	AP4540			50	AP/AZ/AK1400TS
		AP3650		AP4650				
Halocarbon 32 (CH ₂ F ₂)	140	AP3000	55	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	175	AP3002	100	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650			75	AP/AZ/AK1200S

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Recommended Model Selection Table

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Application Process Gas	Valve				Regulator						
	Source applications		Distribution applications		Source applications		Distribution applications				
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation			
Halocarbon 114 (C ₂ Cl ₂ F ₄)	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S			
		AP4650		AP4650			1	AP/AZ/AK1000S			
							7	AP/AZ/AK1402TSA			
Halocarbon 115 (C ₂ ClF ₅)	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP4650		AP4650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF			
					75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS			
							75	AP/AZ/AK1200S			
Halocarbon 116 (C ₂ F ₆)	60	AP3000	40	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP3650		AP3650			10	AP/AZ/AK1000S HF			
							75	AP/AZ/AK1200S	25	AP/AZ/AK1400TS	
	100	AP3002	80	AP4540	125	AP/AZ/AK1200S HF	50	AP/AZ/AK1200S			
		AP3650		AP4650				90	AP/AZ/AK1200S HF		
	275	AP3113	400	AP3700				AZ/AK1300			
AP3125		AP3800				175	AP/AZ/AK1200S FC				
						450	AP9100S				
Halocarbon 125 (C ₂ HF ₅)	180	AP4540	70	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP4650		AP4650	25	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF			
					75	AP/AZ/AK1200S	25	AP/AZ/AK1400TS			
Halocarbon 134A (C ₂ H ₂ F ₄)	55	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP4650		AP4650				50	AP/AZ/AK1000S HF		
		AP3100		AP3800				75	AP/AZ/AK1200S		
	350	AP3700	230	AP3700				50	AP/AZ/AK1400TS		
		AP3800		AP3800				75	AP/AZ/AK1200S		
Halocarbon R218 (C ₃ F ₈)	35	AP3540	20	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF			
	60	AP4540	40	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS			
AP4650		AP4650		75				AP/AZ/AK1200S			
									75	AP/AZ/AK1200S	
Halocarbon C318 (C ₄ F ₈)	25	AP4540	20	AP4540	6	AP/AZ/AK1402TSA	1	AP/AZ/AK1101S			
		AP4650		AP4650			6	AP/AZ/AK1402TSA			
Helium (He)	750	AP3000	250	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S			
		AP3650		AP3650			500	AP1900S	125	AP/AZ/AK1000S HF	
		AP3002		AP4540			625	AP1900S HF	275	AP/AZ/AK1400TS	
	1000	AP3650	450	AP4650	2000	AP/AZ/AK1200S HR	625	AP/AZ/AK1200S			
		AP3130		AP3700						625	AP/AZ/AK1200S HF
	2500	AP3125	2500	AP3800				AZ/AK1300			
							900	AP/AZ/AK1200S HF			
						1200	AP/AZ/AK1200S FC				
						2500	AP9100S				
Hexafluoropropane (C ₃ H ₂ F ₆)	20	AP4540	15	AP4540	6	AP/AZ/AK1402TSA	6	AP/AZ/AK1402TSA			
		AP4625		AP4625							
Hexafluoropropylene (C ₃ F ₆)	60	AP4540	40	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S			
		AP4625		AP4625				50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
								75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
							75	AP/AZ/AK1200S			
Hydrogen (H ₂)	800	AP3000	300	AP3540	125	AP/AZ/AK1500S	65	AP/AZ/AK1000S			
		AP3650		AP3650				500	AP1900S	125	AP/AZ/AK1000S HF
	1600	AP3002	600	AP4540	625	AP1900S HF	275	AP/AZ/AK1400TS			
		AP3650		AP4650				900	AP2700S	625	AP/AZ/AK1200S
	3000	AP3130	3000	AP3700	1200	AP/AZ/AK1200S HR	900	AP/AZ/AK1200S HF			
		AP3125		AP3800						900	AP/AZ/AK1200S HF
							AZ/AK1300S				
							1200	AP/AZ/AK1200S FC			
							3000	AP9100S			
Hydrogen Bromide (HBr)	155	AP3000	55	AP3540	1	AP/AZ/AK1500SH	1	AP/AZ/AK1000SH			
		AP3650		AP3650				30	AP/AZ/AK1000SH HF		
	190	AP3002	95	AP4540				50	AP/AZ/AK1200SH	30	AP/AZ/AK1400TS
AP3650		AP4650		50	AP/AZ/AK1200SH						
Hydrogen Chloride (HCl)	350	AP3000	75	AP3540	2	AP/AZ/AK1500SH	8	AP/AZ/AK1000SH			
		AP3650		AP3650				90	AP/AZ/AK1400TS	20	AP/AZ/AK1000SH HF
	500	AP3002	150	AP4540	150	AP/AZ/AK1200SH	40	AP/AZ/AK1400TS			
		AP3650		AP4650				600	① AP1225SH	85	AP/AZ/AK1200SH
	2000	AP3113	850	AP3700	2000	② AP1210SH HF	160	AP/AZ/AK1200SH HF			
		AP3125		AP3800							AZ/AK1300S
							300	AP/AZ/AK1200SH FC			
							800	AP9100S			

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If ① and ② are indicated in front of a model number, it means two stage regulation is required. The two regulators are in series with ① listed as the first stage and ② listed as the second stage.

Recommendations
Regulators
AP
SL
AZ
AK
BP
Diaphragm Valves
Check Valves
Vacuum Generators
Flow Switches
Technical Data/Glossary of Terms
Precautions

Recommended Model Selection Table

Please read page 32 before selecting a product.

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Hydrogen Chloride Mixtures (Nitrogen Balance)	210	AP3000	105	AP3540	10	AP/AZ/AK1500SH	10	AP/AZ/AK1000SH
		AP3650		AP3650	20	AP1900SH	20	AP/AZ/AK1000SH HF
	265	AP3002	190	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS
		AP3650		AP4650				
Hydrogen Fluoride (HF)	20	AP4540	20	AP4540	5	AP/AZ/AK1402TSA	5	AP/AZ/AK1402TSA
		AP4650		AP4650				
Hydrogen Selenide (H ₂ Se)	125	AP3540	55	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	40	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	215	AP4540	95	AP4540			40	AP/AZ/AK1400TS
		AP4650		AP4650				
Hydrogen Selenide Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ/AK1000S HF
	225	AP3002	160	AP4540	50	AP/AZ/AK1400TS	50	AP/AZ/AK1400TS
		AP3650		AP4650				
Hydrogen Sulfide (H ₂ S)	210	AP3000	80	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	40	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	260	AP3002	140	AP4540			40	AP/AZ/AK1400TS
		AP3650		AP4650				
Krypton (Kr)	105	AP3000	50	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S
		AP3650		AP3650	60	AP/AZ/AK1400TS	30	AP/AZ/AK1000S HF
	130	AP3002	90	AP4540			60	AP/AZ/AK1400TS
		AP3650		AP4650				
Methane (CH ₄)	245	AP3000	120	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ/AK1000S HF
	295	AP3002	210	AP4540	40	AP/AZ/AK1400TS	40	AP/AZ/AK1400TS
		AP3650		AP4650				
Methanol (CH ₃ OH)	40	AP3540	25	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	70	AP4540	40	AP4540				
		AP4650		AP4650				
Methyl bromide (CH ₃ Br)	25	AP4540	15	AP4540	5	AP/AZ/1402TSA	5	AP/AZ/1402TSA
		AP4625		AP4625				
Methyl Chloride (CH ₃ Cl)	60	AP4540	45	AP4540	1	AP/AZ/AK1000S	10	AP/AZ/AK1402TSA
		AP4650		AP4650	10	AP/AZ/AK1402TSA		
Methylsilane (CH ₃ SiH ₃)	200	AP3540	70	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	350	AP4540	120	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP4650		AP4650			75	AP/AZ/AK1200S
Methyl Fluoride (CH ₃ F)	400	AP3000	120	AP3540	5	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	10	AP/AZ/AK1000S HF
	490	AP3002	200	AP4540			50	AP/AZ/AK1400TS
		AP3650		AP4650				
Neon (Ne)	215	AP3000	110	AP3540	20	AP/AZ/AK1500S	20	AP/AZ/AK1000S
		AP3650		AP3650	40	AP1900S	40	AP/AZ/AK1000S HF
	260	AP3002	190	AP4540	300	AP/AZ/AK1200S HF	100	AP/AZ/AK1400TS
		AP3650		AP4650				
Nitrogen (N ₂)	250	AP3000	100	AP3540	50	AP/AZ/AK1500S	25	AP/AZ/AK1000S
		AP3650		AP3650	200	AP1900S	50	AP/AZ/AK1000S HF
	400	AP3002	200	AP4540	250	AP1900S HF	150	AP/AZ/AK1400TS
		AP3650		AP4650	350	AP2700	250	AP/AZ/AK1200S
	1000	AP3130	1000	AP3700	1000	AP/AZ/AK1200S HR	300	AP/AZ/AK1200S HF
		AP3125		AP3800			400	AZ/AK1300S
						1000	AP/AZ/AK1200S FC	
							AP9100S	
Nitrogen Trifluoride (NF ₃)	75	AP3000	60	AP3540	5	AP/AZ1500S	6	AP/AZ1000S
		AP3650		AP3650	60	AP/AZ1400TS	15	AP/AZ1000S HF
	100	AP3002	110	AP4540			30	AP/AZ1400TS
		AP3650		AP4650	150	AP/AZ1400TS	75	AP/AZ1200S
	350	AP3130	500	AP3700	400	AP/AZ1200S HR	125	AP/AZ1200S HF
		AP3125		AP3800				AZ1300S
				1000	①AP9030	250	AP/AZ1200S FC	
					②AP9110	600	AP9100S	

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Recommended Model Selection Table

Please read page 32 before selecting a product.

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Nitric Oxide (NO)	310	AP3000	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	6	AP/AZ/AK1000S HF
	380	AP3002	125	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
		AP3650		AP4650			75	AP/AZ/AK1200S
Nitrous Oxide (N ₂ O)	300	AP3000	70	AP3540	3	AP/AZ/AK1500S VS	8	AP/AZ/AK1000S VS
		AP3650		AP3650	60	AP/AZ/AK1400TS VS	20	AP/AZ/AK1000S VS HF
	500	AP3002	140	AP4540	100	AP/AZ/AK1200S VS	35	AP/AZ/AK1400TS VS
		AP3650		AP4650	150	AP/AZ1200S VS HF	85	AP/AZ/AK1200S VS
	1500	AP3113	750	AP3700	500	① AP/AZ1225S VS	160	AP/AZ/AK1200S VS HF
		AP3125		AP3800		② AP/AZ1200S VS HF		AZ/AK1300S
					1000	① AP9030S VS	320	AP/AZ/AK1200S VS FC
						② AP9100S VS	800	AP9100S VS
Octafluorocyclopentene (C ₅ F ₈)	15	AP4540	15	AP4540	5	AP/AZ/AK1402TSA	0.3	AP/AZ1101S
		AP4650		AP4650			5	AP/AZ/AK1402TSA
Oxygen (O ₂)	250	AP3000	75	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	80	AP1900S	25	AP/AZ/AK1000S HF
	400	AP3002	150	AP4540	150	AP1900S HF	50	AP/AZ/AK1400TS
		AP3650		AP4650	1000	AP/AZ/AK1200S HR	120	AP/AZ/AK1200S
							200	AP/AZ/AK1200S HF
								AZ/AK1300S
Perfluorobutadiene (C ₄ F ₆)	25	AP4540	25	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S
		AP4650		AP4650			5	AP/AZ1402TSA
Phosphine (PH ₃)	320	AP3000	80	AP3540	5	AP/AZ1500S	5	AP/AZ1000S
		AP3650		AP3650	40	AP/AZ1400TS	10	AP/AZ1000S HF
	390	AP3002	145	AP4540				
Phosphine Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF
	225	AP3002	160	AP4540				
Phosphorous Pentafluoride (PF ₅)	15	AP3000	5	AP3540	10	AP/AZ1500S	10	AP/AZ1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF
	19	AP3002	9	AP4540				
		AP3650		AP4650				
41	AP3130	52	AP3700					
	AP3125		AP3800					
Propane (C ₃ H ₈)	65	AP3540	42	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	115	AP4450	75	AP4540	75	AP/AZ/AK1200S	50	AP/AZ/AK1400TS
Propene (C ₃ H ₆)	185	AP3540	75	AP3540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP3650		AP3650	50	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
	320	AP4540	125	AP4540			50	AP/AZ/AK1400TS
		AP4650		AP4650				
Silane (SiH ₄)	150	AP3000	75	AP3540	5	AP/AZ1500S	10	AP/AZ1000S
		AP3650		AP3650	40	AP/AZ1400TS	25	AP/AZ1000S HF
	250	AP3002	150	AP4540	50	AP2700S	50	AP/AZ1400TS
		AP3650		AP4650	60	AP/AZ1200S	120	AP/AZ1200S
	600	AP3130	750	AP3700	100	AP/AZ1200S HF	200	AP/AZ1200S HF
		AP3125		AP3800	500	① AP/AZ1225S VS	200	AZ1300S
					② AP/AZ1200S HF	400	AP/AZ1200S FC	
						1000	AP9100S	
Silane Mixtures (Nitrogen Balance)	185	AP3000	90	AP3540	10	AP/AZ1500S	10	AP/AZ1000S
		AP3650		AP3650	20	AP1900S	20	AP/AZ1000S HF
	225	AP3002	160	AP4540	40	AP/AZ1400TS	40	AP/AZ1400TS
		AP3650		AP4650				
Silicon Tetrachloride (SiCl ₄)	10	AP4540	10	AP4540	5	AP/AZ1402TSA	0.5	AP/AZ1101S
		AP4650		AP4650			5	AP/AZ1402TSA
Silicon Tetrafluoride (SiF ₄)	95	AP3000	45	AP3540	10	AP/AZ/AK1500S	10	AP/AZ/AK1000S
		AP3650		AP3650	40	AP/AZ/AK1400TS	20	AP/AZ/AK1000S HF
	100	AP3002	80	AP4540			40	AP/AZ/AK1400TS
		AP3650		AP4650				

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Recommendations

Regulators

AP

SL

AZ

AK

BP

Valves

Diaphragm

AP

AZ

AK

Valves

Check

Valves

Generators

Vacuum

Generators

Flow

Switches

Technical Data/

Glossary of Terms

Precautions

Recommended Model Selection Table

Please read page 32 before selecting a product.

Application Process Gas	Valve				Regulator			
	Source applications		Distribution applications		Source applications		Distribution applications	
	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation	Maximum flow (slpm)	Recommendation
Sulfur Dioxide (SO ₂)	80	AP4540	30	AP4540	1	AP/AZ/AK1000S	6	AP/AZ/AK1402TSA
		AP4650		AP4650	6	AP/AZ/AK1402TSA		
Sulfur Hexafluoride (SF ₆)	125	AP3000	35	AP3540	3	AP/AZ/AK1500S	5	AP/AZ/AK1000S
		AP3650		AP3650	40	AP/AZ/AK1400TS	12	AP/AZ/AK1000S HF
	200	AP3000	75	AP4540	60	AP/AZ/AK1200S	25	AP/AZ/AK1400TS
		AP3650		AP4650	150	AP/AZ/AK1200S HF	60	AP/AZ/AK1200S HF
	500	AP3113	400	AP3700	500	AP9100S	90	AZ/AK1300S
		AP3125		AP3800			180	AP/AZ/AK1200S FC
						400	AP9100S	
Sulfur Tetrafluoride (SF ₄)	200	AP4540	80	AP4540	3	AP/AZ/AK1500S	3	AP/AZ/AK1000S
		AP4650		AP4650	15	AP/AZ/AK1400TS	5	AP/AZ/AK1000S HF
Trichlorosilane (SiHCl ₃)	35	AP4540	30	AP4540	10	AP/AZ/AK1402TSA	15	AP/AZ/AK1400TS
Trimethylsilane ((CH ₃) ₃ SiH)	30	AP4540	25	AP4540	7	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650			10	AP/AZ/AK1402TSA
Tungsten Hexafluoride (WF ₆)	10	AP4540	10	AP4540	5	AP/AZ/AK1402TSA	0.5	AP/AZ/AK1101S
		AP4650		AP4650			7	AP/AZ/AK1402TSA
Xenon (Xe)	85	AP3000	40	AP3540	5	AP/AZ/AK1500S	0.3	AP/AZ/AK1101SH
		AP3650		AP3650	25	AP/AZ/AK1400TS	5	AP/AZ/AK1402TSA
	100	AP3002	70	AP4540			5	AP/AZ/AK1000S
		AP3650		AP4650			10	AP/AZ/AK1000S HF
						25	AP/AZ/AK1400TS	

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