ADVANCED PRESSURE TECHNOLOGY

PRESSURE REGULATOR AND VALVE SELECTION GUIDE

Technical Bulletin #208K

Scope: This document is a reference guide to help customers determine an appropriate AP Tech valve and regulator to be used in process gas systems. For Information and specifications related to the specific model, please refer to the catalog data sheet.

Valve and Regulator Recommendations for Source Gas Cabinets and Gas Distribution

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General Notes and Definitions

Source Regulator: Pressure regulator closest to the gas source cylinder or vessel (first regulator in the system)

Source Valve: Valves upstream (inlet side) of the source regulator

Distribution Regulator: Any regulator downstream (outlet side) of the source regulator

Distribution Valve: Any valve downstream (outlet side) of the source regulator

Valve Recommendation: Valve model recommendations limited for sake of brevity. Different models with same basic size and rating may also be used. Example: 3600, 3650 and 3657 may be used in place of 3625.

1225/1210: Two stage regulation required, two regulators in series

1200S: Red indicates heating required, refer to PN 407

Conditions: Standard conditions of temperature and pressure

Inlet Pressure Assumption: Source[1] 150 psig (10 bar) or vapor pressure of liquified gas
Distribution[2] 30 psig (2 bar) unless low vapor pressure gas

Outlet Pressure Assumption: Minimum outlet pressure > 10 psig (0.7 bar)

[1]Source pressure for non-liquified gas assumed at worst case for an empty cylinder
[2]Distribution assumed to be typical usage, specific operating conditions may require different selection

Caution: Read and understand definitions prior to utilizing the guide's recommendations.

Caution: Product selection is the sole responsibility of the user, regardless of any recommendations or suggestions made by the factory, such as this Technical Bulletin. The user shall make selections based upon their own analysis and testing with regard to function, material compatibility and product ratings. Proper installation, operation and maintenance are also required to assure safe, trouble free performance.

Caution: 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.

Caution: Please consult the factory for recommendations beyond the scope of this document or if any doubt exists.

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
		SOURCE VALVE GUIDELINE		DISTRIBUTION VALVE GUIDELINE		SOURCE REGULATOR GUIDELINE		DISTRIBUTION REGULATOR GUIDELINE
Acetylene* (C_2H_2)	230	3000	25	3550	3	1500S*	3	1000S
		3625		3625	50	1400TS*	6	1000S HF
	280	4000	45	4550	75	1200S*	50	1400TS
		3625		4625			75	1200S
			400	3700			95	1200 HF
				3800			95	1300S
Air	185	3000	90	3550	30	1500S	30	1000S
		3625		3625	100	1900S	50	1000S HF
	225	4000	160	4550	200	1400TS	150	1400TS
		3625		4625	800	1200S HR	400	1200S
		3100		3800			600	1200S HF
	550	3130	890	3700			600	1300S
	475	3125		3800				
Ammonia (NH_3)	250	3550	100	3550	5	1500S	5	1000S
		3625		3625	50	1400TS	30	1000S HF
	450	4550	225	4550	75	1200S	60	1400TS
		4625		4625	400	1200S	125	1200S
	1000	3113	1000	3700	600	1200S HF	250	1200S HF
		3125		3800	1100	9100S	250	1300S
							500	1200S FC
							1000	9100S
Argon (Ar)	200	3000	80	3550	10	1500S	10	1000S
		3625		3625	100	1900S	25	1000S HF
	350	4000	150	4550	300	1900S HF	50	1400TS
		3625		4625	600	1200S HR	100	1200S
	1000	3130	800	3700			200	1200S HF
		3125		3800			200	1300S
							400	1200S FC
							1000	9100S

Model number applies to all applicable series - AP, AZ and AK
Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

*15 psig maximum source regulator outlet pressure

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Arsine (AsH_3)	140	**3550**	55	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	40	**1400TS**	20	**1000S HF**
	240	**4550**	95	**4550**				
		4625		**4625**				
Arsine Mixtures (Nitrogen Balance)	185	**3000**	90	**3550**	15	**1500S**	15	**1000S**
		3625		**3625**	50	**1900S**	50	**1000S HF**
	225	**4000**	160	**4550**	150	**1400TS**	150	**1400 TS**
		3625		**4625**				
Boron Trichloride (BCl_3)	20	**4550**	15	**4550**	6	**1402TSA**	0.4	**1101SH**
		4625		**4625**			6	**1402TSA**
Boron Trichloride Mix (Nitrogen Balance)	185	**3000**	90	**3550**	15	**1500S**	15	**1000S**
		3625		**3625**	60	**1400TS**	30	**1000S HF**
	225	**4000**	160	**4550**			60	**1400TS**
		3625		**4625**				
Boron Trifluoride (BF_3)	115	**3000**	60	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	25	**1400TS**	10	**1000S HF**
	145	**4000**	100	**4550**			25	**1400TS**
		3625		**4625**				
Boron 11 Trifluoride ($11BF_3$)	115	**3000**	60	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	25	**1400TS**	10	**1000S HF**
	145	**4000**	100	**4550**			25	**1400TS**
		3625		**4625**				
Butadiene (C_4H_6)	60	**4550**	60	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	40	**1400T**	5	**1000S HF**
Butane (normal) (C_4H_{10})	60	**4550**	60	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	40	**1400T**	5	**1000S HF**
Butene-1 (C_4H_8)	65	**4550**	60	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	50	**1400TS**	5	**1000S HF**
Carbon Dioxide (CO_2)	500	**3000**	75	**3550**	3	**1500S**	8	**1000S**
		3625		**3625**	75	**1400TS**	20	**1000S HF**
	700	**4000**	140	**4550**	150	**1200S VS**	40	**1400TS**
		3625		**4625**	500	**1225S VS &**	100	**1200S**
	2500	**3113**	750	**3700**		**1200S HF VS**	160	**1200S HF**
		3125		**3800**	1000	**9030S VS &**	160	**1300S**
						9100S VS	325	**1200S FC**
							800	**9100S**
Carbon Monoxide (CO)	185	**3000**	90	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	15	**1900S**	15	**1000S HF**
	225	**4000**	160	**4550**	50	**1400TS**	50	**1400TS**
		3625		**4625**				
Carbonyl Fluoride (COF_2)	115	**3000**	60	**3550**	5	**1500S**	3	**1000S**
		3625		**3625**	25	**1400TS**	10	**1000S HF**
	200	**4000**	100	**4550**				
		3625		**4625**				
Chlorine (Cl_2)	75	**3550**	50	**3550**	3	**1500SH**	5	**1000SH**
		3625		**3625**	50	**1400TS**	15	**1000SH HF**
	150	**4550**	100	**4550**	75	**1200SH**	30	**1400TS**
		4625		**4625**	200	**1200SH HF**	75	**1200SH**
	300	**3113**	400	**3700**			125	**1200SH HF**
		3125		**3800**			125	**1300S**
							250	**1200SH FC**
Chlorine Trifluoride (ClF_3)	20	**4550**	15	**4550**	6	**1402TSA**	0.5	**1101S**
		4625		**4625**			6	**1402TSA**
Diborane Mixtures (Nitrogen Balance)	185	**3000**	90	**3550**	5	**1700S**	10	**1000S**
		3625		**3625**	225	**2700S**	20	**1000S HF**
	225	**4000**	160	**4550**				
		3625		**4625**				
Dichlorosilane (SiH_2Cl_2)	20	**4550**	20	**4550**	7	**1402TSA**	1	**1101S**
		4625		**4625**			7	**1402TSA**

SOURCE VALVE GUIDELINE

DISTRIBUTION VALVE GUIDELINE

SOURCE REGULATOR GUIDELINE

DISTRIBUTION REGULATOR GUIDELINE

Model number applies to all applicable series - AP, AZ and AK
Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Diethyltelluride ($Te(C_2H_5)_2$)	70	**3000**	35	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	5	**1900S**	5	**1000S HF**
	85	**4000**	60	**4550**	25	**1400TS**	25	**1400TS**
		3625		**4625**				
Difluoroethylene ($C_2H_2F_2$)	140	**3000**	55	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	50	**1400TS**	6	**1000S HF**
	200	**4000**	100	**4550**	75	**1200S**	50	**1400TS**
		3625		**4625**			75	**1200S**
Dimethylsilane (C_2SiH_8)	14	**4550**	7	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	50	**1400TS**	50	**1400TS**
	150	**3700**	75	**3700**	75	**1200S**	75	**1200S**
		3800		**3800**				
Disilane (Si_2H_6)	14	**4550**	7	**4550**	1	**1000S**	1	**1000S**
		4625		**4625**	7	**1402TSA**	7	**1402TSA**
Ethylene (C_2H_4)	380	**3000**	90	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	50	**1400TS**	5	**1000S HF**
	485	**4000**	160	**4550**	75	**1200S**	50	**1400TS**
		3625		**4625**			75	**1200S**
Fluorine* (F_2)	**Consult Factory**	**Consult Factory**	**Consult Factory**	**Consult Factory**	**Consult Factory**	**Consult Factory**	**Consult Factory**	**Consult Factory**
Fluorine Mixtures* (20% maximum F_2)	185	**3000**	90	**3550**	5	**1500SHEM**	5	**1000SH**
		3625		**3625**	50	**1900SHEM**	10	**1000SH HF**
	225	**4000**	160	**4550**			50	**1400TS**
		3625		**4625**				
Germane (GeH_4)	10	**3550**	4	**3550**	1	**1000S**	1	**1000S**
		3625		**3625**	7	**1402TS**	7	**1402TS**
	18	**4550**	7	**4550**				
		4625		**4625**				
Germane Mixtures (Nitrogen Balance)	185	**3000**	90	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	20	**1900S**	20	**1000S HF**
	225	**4000**	160	**4550**	50	**1400TS**	50	**1400TS**
		3625		**4625**				
Halocarbon 12 (CCl_2F_2)	55	**4550**	40	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	50	**1400TS**	5	**1000S HF**
							50	**1400TS**
Halocarbon 12B2 (CBr_2F_2)	15	**4550**	15	**4550**	5	**1400TSA**	0.5	**1101S**
		4625		**4625**			5	**1402TSA**
Halocarbon 13 ($CClF_3$)	140	**3000**	40	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	50	**1400TS**	5	**1000S HF**
	170	**4000**	70	**4550**			50	**1400TS**
		3625		**4625**				
Halocarbon 13B1 ($CBrF_3$)	110	**3550**	35	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	50	**1400TS**	5	**1000S HF**
	190	**4550**	65	**4550**			50	**1400TS**
		4625		**4625**				
Halocarbon 14 (CF_4)	10	**3000**	50	**3550**	10	**1500S**	5	**1000S**
		3625		**3625**	40	**1900S**	15	**1000S HF**
	200	**4000**	100	**4550**	80	**1900S HF**	30	**1400TS**
		3625		**4625**	500	**1200S HR**	60	**1200S**
	600	**3130**	500	**3700**			100	**1200S HF**
		3125		**3800**			100	**1300**
							250	**1200S FC**
							500	**9100S**
Halocarbon 21 ($CHCl_2F$)	25	**4550**	15	**4550**	5	**1402TSA**	0.5	**1101S**
		4625		**4625**			0.5	**1001S**
							5	**1402TSA**
Halocarbon 23 (CHF_3)	115	**3000**	145	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	50	**1400TS**	20	**1000S HF**
	140	**4000**	250	**4550**			50	**1400TS**
		3625		**4625**				

SOURCE VALVE GUIDELINE

DISTRIBUTION VALVE GUIDELINE

SOURCE REGULATOR GUIDELINE

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Model number applies to all applicable series - AP, AZ and AK
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*F_2 and F_2 mixes require system passivation, please consult gas supplier for proper procedures.

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Halocarbon 32 (CH_2F_2)	140 175	**3000** **3625** **4000** **3625**	55 100	**3550** **3625** **4550** **4625**	3 50 75	**1500S** **1400TS** **1200S**	3 6 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Halocarbon 114 (C_2ClF_4)	30	**4550** **4625**	25	**4550** **4625**	7	**1402TSA**	0.5 1 7	**1101S** **1000S** **1402TSA**
Halocarbon 115 (C_2ClF_5)	60	**4550** **4625**	40	**4550** **4625**	3 50 75	**1500S** **1400TS** **1200S**	3 5 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Halocarbon 116 (C_2F_6)	60 100 275	**3000** **3625** **4000** **3625** **3113** **3125**	40 80 400	**3550** **3625** **4550** **4625** **3700** **3800**	3 50 75 125	**1500S** **1400TS** **1200S** **1200S HF**	3 10 25 50 90 90 175 450	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300** **1200S FC** **9100S**
Halocarbon 125 (C_2HF_5)	180	**4550** **4625**	70	**4550** **4625**	3 25 75	**1500S** **1400TS** **1200S**	3 5 25 75	**1000S** **1000S HF** **1400TS** **1200S**
Halocarbon 134A ($C_2H_2F_4$)	55 350	**4550** **4625** **3100** **3700** **3800**	40 230	**4550** **4625** **3800** **3700** **3800**	3 50 75	**1500S** **1400TS** **1200S**	3 5 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Halocarbon R218 (C_3F_8)	35 60	**3550** **3625** **4550** **4625**	20 40	**3550** **3625** **4550** **4625**	3 50 75	**1500S** **1400TS** **1200S**	3 5 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Halocarbon C318 (C_4F_8)	25	**4550** **4625**	20	**4550** **4625**	6	**1402TSA**	1 6	**1101S** **1402TSA**
Halocarbon C1418 (Octafluorocyclopentene) (C_5F_8)	7	**4550** **4625**	7	**4550** **4625**	0.2 3	**1101S** **1402TSA**	N/A	**Regulator not required**
Helium (He)	750 1000 2500	**3000** **3625** **4000** **3625** **3130** **3125**	250 450 2500	**3550** **3625** **4550** **4625** **3700** **3800**	125 500 625 2000	**1500S** **1900S** **1900S HF** **1200S HR**	65 125 275 625 900 900 1200 2500	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300** **1200S FC** **9100S**
Hexafluoropropane ($C_3H_2F_6$)	20	**4550** **4625**	15	**4550** **4625**	6	**1402TSA**	6	**1402TSA**
Hexafluoropropylene (C_3F_6)	60	**4550** **4625**	40	**4550** **4625**	3 50 75	**1500S** **1400TS** **1200S**	3 5 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Hydrogen (H_2)	800 1600 3000	**3000** **3625** **4000** **3625** **3130** **3125**	300 600 3000	**3550** **3625** **4550** **4625** **3700** **3800**	125 500 625 900 1200	**1500S** **1900S** **1900S HF** **2700S** **1200S HR**	65 125 275 625 900 900 1200 3000	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300S** **1200S FC** **9100S**
Hydrogen Bromide (HBr)	155 190	**3000** **3625** **4000** **3625**	55 95	**3550** **3625** **4550** **4625**	1 30 50	**1500SH** **1400TS** **1200SH**	1 2 30 50	**1000SH** **1000SH HF** **1400TS** **1200SH**

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DISTRIBUTION REGULATOR GUIDELINE

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Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Hydrogen Chloride (HCl)	350	**3000**	75	**3550**	2	**1500SH**	8	**1000SH**
		3625		**3625**	90	**1400TS**	20	**1000SH HF**
	500	**4000**	150	**4550**	150	**1200SH**	40	**1400TS**
		3625		**4625**	600	**1225SH &**	85	**1200SH**
	2000	**3113**	850	**3700**		**1210SH HF**	160	**1200SH HF**
		3125		**3800**	2000	**9030S &**	160	**1300S**
						9110S	300	**1200SH FC**
							800	**9100S**
Hydrogen Chloride Mixtures (Nitrogen Balance)	210	**3000**	105	**3550**	10	**1500SH**	10	**1000SH**
		3625		**3625**	20	**1900SH**	20	**1000SH HF**
	265	**4000**	190	**4550**	40	**1400TS**	40	**1400TS**
		3625		**4625**				
Hydrogen Fluoride (HF)	20	**4550**	20	**4550**	5	**1402TSA**	5	**1402TSA**
		4625		**4625**				
Hydrogen Selenide (H_2Se)	125	**3550**	55	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	40	**1400TS**	20	**1000S HF**
	215	**4550**	95	**4550**			40	**1400TS**
		4625		**4625**				
Hydrogen Selenide Mixtures (Nitrogen Balance)	185	**3000**	90	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	20	**1900S**	20	**1000S HF**
	225	**4000**	160	**4550**	50	**1400TS**	50	**1400TS**
		3625		**4625**				
Hydrogen Sulfide (H_2S)	210	**3000**	80	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	40	**1400TS**	10	**1000S HF**
	260	**4000**	140	**4550**			40	**1400TS**
		3625		**4625**				
Krypton (Kr)	105	**3000**	50	**3550**	20	**1500S**	20	**1000S**
		3625		**3625**	60	**1400TS**	30	**1000S HF**
	130	**4000**	90	**4550**			60	**1400TS**
		3625		**4625**				
Methane (CH_4)	245	**3000**	120	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	20	**1900S**	20	**1000S HF**
	295	**4000**	210	**4550**	40	**1400TS**	40	**1400TS**
		3625		**4625**				
Methanol (CH_3OH)	70	**4550**	40	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	50	**1400TS**	5	**1000S HF**
Methyl Bromide (CH_3Br)	25	**4550**	15	**4550**	5	**1402TSA**	5	**1402TSA**
		4625		**4625**				
Methyl Chloride (CH_3Cl)	60	**4550**	45	**4550**	1	**1000S**	10	**1402TSA**
		4625		**4625**	10	**1402TSA**		
Methysilane (CH_3SiH_3)	200	**3550**	70	**3550**	3	**1500S**	3	**1000S**
		3625		**3625**	50	**1400TS**	5	**1000S HF**
	350	**4550**	120	**4550**	75	**1200S**	50	**1400TS**
		4625		**4625**			75	**1200S**
Methyl Fluoride (CH_3F)	400	**3000**	120	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	50	**1400TS**	10	**1000S HF**
	490	**4000**	200	**4550**			50	**1400TS**
		3625		**4625**				
Neon (Ne)	215	**3000**	110	**3550**	20	**1500S**	20	**1000S**
		3625		**3625**	40	**1900S**	40	**1000S HF**
	260	**4000**	190	**4550**	300	**1200S HR**	100	**1400TS**
		3625		**4625**				
Nitrogen (N_2)	250	**3000**	100	**3550**	50	**1500S**	25	**1000S**
		3625		**3625**	50	**1700**	50	**1000S HF**
	400	**4000**	200	**4550**	200	**1900S**	150	**1400TS**
		3625		**4625**	250	**1900S HF**	250	**1200S**
	1000	**3130**	1000	**3700**	250	**2700**	300	**1200S HF**
		3125		**3800**	1000	**1200S HR**	300	**1300S**
							400	**1200S FC**
							1000	**9100S**

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DISTRIBUTION VALVE GUIDELINE

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Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Nitrogen Dioxide (NO_2)	60	**4550** **4625**	60	**4550** **4625**	4 45	**1500S** **1400T**	4 6	**1000S** **1000S HF**
Nitrogen Trifluoride (NF_3)	75 100 350	**3000** **3625** **4000** **3625** **3130** **3125**	60 110 500	**3550** **3625** **4550** **4625** **3700** **3800**	5 60 150 150 400 1000	**1500S** **1400TS** **1400TS** **2700S** **1200S HR** **9030 & 9110**	6 15 30 75 125 125 250 600	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300S** **1200S FC** **9100S**
Nitric Oxide (NO)	310 380	**3000** **3625** **4000** **3625**	75 125	**3550** **3625** **4550** **4625**	3 50 75	**1500S** **1400TS** **1200S**	3 6 50 75	**1000S** **1000S HF** **1400TS** **1200S**
Nitrous Oxide (N_2O)	300 500 1500	**3000VS** **3625VS** **3002VS** **3625VS** **3113VS** **3125VS**	70 140 750	**3550** **3625** **4550** **4625** **3700** **3800**	3 60 100 150 500 1000	**1500S VS** **1400TS VS** **1200S VS** **1200S VS HF** **1225S VS &** **1200S VS HF** **9030S VS &** **9100S VS**	8 20 35 85 160 160 320 800	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300S** **1200S FC** **9100S**
Oxygen (O_2)	250 400	**3000** **3625** **4000** **3625**	75 150 1000	**3550** **3625** **4550** **4625** **3700** **3800**	10 80 150 1000	**1500S** **1900S** **1900S HF** **1200S HR**	10 25 50 120 200 200 400 1000	**1000S** **1000S HF** **1400TS** **1200S** **1200S HF** **1300S** **1200S FC** **9100S**
Perfluoropropane* (C_3F_8)	70 125	**3550** **3625** **4550** **4625**	35 60	**3550** **3625** **4550** **4625**	2 20	**1500S** **1400TS**	2 4 20	**1000S** **1000S HF** **1400TS**
Perfluorobutadiene (C_4F_6)	25	**4550** **4625**	25	**4550** **4625**	5	**1402TSA**	0.5 5	**1101S** **1402TSA**
Phosphine (PH_3)	320 390	**3000** **3625** **4000** **3625**	80 145	**3550** **3625** **4550** **4625**	5 40	**1500S** **1400TS**	5 10	**1000S** **1000S HF**
Phosphine Mixtures (Nitrogen Balance)	185 225	**3000** **3625** **4000** **3625**	90 160	**3550** **3625** **4550** **4625**	10 20	**1500S** **1900S**	10 20	**1000S** **1000S HF**
Phosphorous Pentafluoride (PF_5)	15 19 41	**3000** **3625** **4000** **3625** **3130** **3125**	5 9 52	**3550** **3625** **4550** **4625** **3700** **3800**	10 20	**1500S** **1900S**	10 20	**1000S** **1000S HF**
Propane (C_3H_8)	65 115	**3550** **3625** **4550** **4625**	42 75	**3550** **3625** **4550** **4625**	3 50	**1500S** **1400TS** **1200S**	3 5 50	**1000S** **1000S HF** **1400TS**
Propene (C_3H_6)	185 320	**3550** **3625** **4550** **4625**	75 125	**3550** **3625** **4550** **4625**	3 50	**1500S** **1400TS**	3 5 50	**1000S** **1000S HF** **1400TS**

SOURCE VALVE GUIDELINE

DISTRIBUTION VALVE GUIDELINE

SOURCE REGULATOR GUIDELINE

DISTRIBUTION REGULATOR GUIDELINE

Model number applies to all applicable series - AP, AZ and AK
Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

*Same as Halocarbon R218

Process Gas	Maximum Flow (slpm)	Source Valves AP, AZ or AK	Maximum Flow (slpm)	Distribution Valves AP, AZ or AK	Maximum Flow (slpm)	Source Regulator AP, AZ or AK	Maximum Flow (slpm)	Distribution Regulator AP, AZ or AK
Silane (SiH_4)	150	**3000**	75	**3550**	5	**1500S**	10	**1000S**
		3625		**3625**	40	**1400TS**	25	**1000S HF**
	250	**4000**	150	**4550**	50	**2700S**	50	**1400TS**
		3625		**4625**	60	**1200S**	120	**1200S**
	600	**3130**	750	**3700**	100	**1200S HF**	200	**1200S HF**
		3125		**3800**	500	**1225S & 1200S HF**	200	**1300S**
							400	**1200S FC**
							1000	**9100S**
Silane Mixtures (Nitrogen Balance)	185	**3000**	90	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	20	**1900S**	20	**1000S HF**
	225	**4000**	160	**4550**	40	**1400TS**	40	**1400TS**
		3625		**4625**				
Silicon Tetrachloride ($SiCl_4$)	10	**4550**	10	**4550**	2	**1402TSA**	0.2	**1101S**
		4625		**4625**			2	**1402TSA**
Silicon Tetrafluoride (SiF_4)	95	**3000**	45	**3550**	10	**1500S**	10	**1000S**
		3625		**3625**	40	**1400TS**	20	**1000S HF**
	115	**4000**	80	**4550**			40	**1400TS**
		3625		**4625**				
Sulfur Dioxide (SO_2)	80	**4550**	30	**4550**	1	**1000S**	6	**1402TSA**
		4625		**4625**	6	**1402TSA**		
Sulfur Hexafluoride (SF_6)	125	**3000**	35	**3550**	3	**1500S**	5	**1000S**
		3625		**3625**	40	**1400TS**	12	**1000S HF**
	200	**4000**	75	**4550**	60	**1200S**	25	**1400TS**
		3625		**4625**	150	**1200S HF**	60	**1200S**
	500	**3113**	400	**3700**	500	**9100S**	90	**1200S HF**
		3125		**3800**			90	**1300S**
							180	**1200S FC**
							400	**9100S**
Sulfur Tetrafluoride (SF_4)	200	**4550**	80	**4550**	3	**1500S**	3	**1000S**
		4625		**4625**	15	**1400TS**	5	**1000S HF**
							15	**1400TS**
Trichlorosilane ($SiHCl_3$)	35	**4550**	30	**4550**	10	**1402TSA**	0.5	**1101S**
		4625		**4625**			10	**1402TSA**
Trimethylsilane ($(CH_3)_3SiH$)	30	**4550**	25	**4550**	7	**1402TSA**	0.5	**1101S**
		4625		**4625**			7	**1402TSA**
Tungsten Hexafluoride (WF_6)	10	**4550**	10	**4550**	5	**1402TSA**	0.3	**1101SH**
		4625		**4625**			5	**1402TSA**
Xenon (Xe)	85	**3000**	40	**3550**	5	**1500S**	5	**1000S**
		3625		**3625**	25	**1400TS**	10	**1000S HF**
	100	**4000**	70	**4550**			25	**1400TS**
		3625		**4625**				

SOURCE VALVE GUIDELINE

DISTRIBUTION VALVE GUIDELINE

SOURCE REGULATOR GUIDELINE

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Model number applies to all applicable series - AP, AZ and AK
Example: 1000 means AP, AZ and AK 1000

Red highlight denotes heating required to achieve stated flow.

Alphabetical Listing by Gas Formula

$11BF_3$	Boron 11 Trifluoride	$C_3H_2F_6$	Hexafluoropropane	CH_3F	Methyl Fluoride	He	Helium	SiH_2Cl_2	Dichlorosilane
Ar	Argon	C_3H_6	Propene	CH_3OH	Methanol	HF	Hydrogen Fluoride	SiH_4	Silane
AsH_3	Arsine	C_3H_8	Propane	CH_3SiH_3	Methysilane	Kr	Krypton	$SiHCl_3$	Trichlorosilane
BCl_3	Boron Trichloride	C_4F_6	Perfluorobutadiene	CH_4	Methane	N_2	Nitrogen	SO_2	Sulfur Dioxide
BF_3	Boron Trifluoride	C_4F_8	Halocarbon C318	$CHCl_2F$	Halocarbon 21	N_2O	Nitrous Oxide	$Te(C_2H_5)_2$	Diethyltelluride
B_2H_6	Diborane	C_4H_6	Butadiene	CHF_3	Halocarbon 23	Ne	Neon	WF_6	Tungsten Hexafluoride
C_2ClF_4	Halocarbon 114	C_4H_8	Butene-1	Cl_2	Chlorine	NF_3	Nitrogen Trifluoride	Xe	Xenon
C_2ClF_5	Halocarbon 115	C_4H_{10}	Butane (normal)	ClF_3	Chlorine Trifluoride	NH_3	Ammonia		
C_2F_6	Halocarbon 116	C_5F_8	Halocarbon C1418	CO	Carbon Monoxide	NO	Nitric Oxide		
C_2H_2	Acetylene	CBr_2F_2	Halocarbon 12B2	CO_2	Carbon Dioxide	NO_2	Nitric Dioxide		
$C_2H_2F_2$	Difluoroethylene	$CBrF_3$	Halocarbon 13B1	COF_2	Carbonyl Fluoride	O_2	Oxygen		
$C_2H_2F_4$	Halocarbon 134A	CCl_2F_2	Halocarbon 12	F_2	Fluorine	PF_5	Phosphorous Pentafluoride		
C_2H_4	Ethylene	$CClF_3$	Halocarbon 13	GeH_4	Germane	PH_3	Phosphine		
C_2HF_5	Halocarbon 125	CF_4	Halocarbon 14	H_2	Hydrogen	SF_4	Sulfur Tetrafluoride		
C_2SiH_8	Dimethylsilane	CH_2F_2	Halocarbon 32	H_2Se	Hydrogen Selenide	SF_6	Sulfur Hexafluoride		
C_3F_6	Hexafluoropropylene	$(CH_3)_3SiH$	Trimethylsilane	H_2S	Hydrogen Sulfide	Si_2H_6	Disilane		
C_3F_8	Halocarbon R218	CH_3Br	Methyl Bromide	HBr	Hydrogen Bromide	$SiCl_4$	Silicon Tetrachloride		
C_3F_8	Perfluoropropane	CH_3Cl	Methyl Chloride	HCl	Hydrogen Chloride	SiF_4	Silicon Tetrafluoride		