

Ultimate Process Gas Load Calculations - ARGON
 2.75" Conflat High Vacuum System
 Design Iteration #4

1.) Maximum Gas Loads for ARGON for Processes in Molecular Flow (Argon Ion Beam Systems)

$$S_e = (Q_{total})/P_w$$

$$S_e = \text{Effective Speed} = 11.516 \text{ L/s (Argon @ 20C)}$$

$$Q_{total} = \text{Total Gas Load (Torr} \cdot \text{L/s)} = Q_{\text{water_vapor}} + Q_{\text{process_gas}}$$

$$P_w = \text{Working Pressure (Torr)}$$

$$Q_{\text{process_gas}} = (S_e \times P_w) - Q_{\text{water_vapor}}$$

$$1 \text{ Torr} \cdot \text{L/s} = 80 \text{ SCCM}$$

a.) Unbaked, Pumped 1 hr

S_e (L/s)	P_w (Torr)	$Q_{\text{water_vapor}}$ (Torr-L/s)	$Q_{\text{process_gas}}$ (Torr-L/s)	Gas Flow Rate (SCCM)
11.516	1.000E-07	2.903E-05	-2.788E-05	-2.230E-03
11.516	1.000E-06	2.903E-05	-1.751E-05	-1.401E-03
11.516	1.000E-05	2.903E-05	8.613E-05	6.890E-03
11.516	1.000E-04	2.903E-05	1.123E-03	8.981E-02

b.) Unbaked, Pumped > 24 hr

S_e (L/s)	P_w (Torr)	$Q_{\text{water_vapor}}$ (Torr-L/s)	$Q_{\text{process_gas}}$ (Torr-L/s)	Gas Flow Rate (SCCM)
11.516	1.000E-07	1.428E-05	-1.313E-05	-1.050E-03
11.516	1.000E-06	1.428E-05	-2.764E-06	-2.211E-04
11.516	1.000E-05	1.428E-05	1.009E-04	8.070E-03
11.516	1.000E-04	1.428E-05	1.137E-03	9.099E-02

c.) Baked, Pumped > 24 hr

S_e (L/s)	P_w (Torr)	$Q_{\text{water_vapor}}$ (Torr-L/s)	$Q_{\text{process_gas}}$ (Torr-L/s)	Gas Flow Rate (SCCM)
11.516	1.000E-07	9.589E-06	-8.437E-06	-6.750E-04
11.516	1.000E-06	9.589E-06	1.927E-06	1.542E-04
11.516	1.000E-05	9.589E-06	1.056E-04	8.446E-03
11.516	1.000E-04	9.589E-06	1.142E-03	9.136E-02

2.) Maximum Gas Loads for Argon for Processes in Transitional Flow (Argon Plasma Systems)

$$S_e = (Q_{total})/P_w$$

$$S_e = \text{Effective Speed} = 13.705 \text{ L/s (Argon @ 20C)}$$

$$Q_{total} = \text{Total Gas Load (Torr} \cdot \text{L/s)} = Q_{water_vapor} + Q_{process_gas}$$

$$P_w = \text{Working Pressure (Torr)}$$

$$Q_{process_gas} = (S_e \times P_w) - Q_{water_vapor}$$

$$1 \text{ Torr} \cdot \text{L/s} = 80 \text{ SCCM}$$

a.) Unbaked, Pumped 1 hr

S_e (L/s)	P_w (Torr)	Q_{water_vapor} (Torr-L/s)	$Q_{process_gas}$ (Torr-L/s)	Gas Flow Rate (SCCM)
13.705	1.000E-03	2.903E-05	1.368E-02	1.094E+00
13.705	1.000E-02	2.903E-05	1.370E-01	1.096E+01

b.) Unbaked, Pumped > 24 hr

S_e (L/s)	P_w (Torr)	Q_{water_vapor} (Torr-L/s)	$Q_{process_gas}$ (Torr-L/s)	Gas Flow Rate (SCCM)
13.705	1.000E-03	1.428E-05	1.369E-02	1.095E+00
13.705	1.000E-02	1.428E-05	1.370E-01	1.096E+01

c.) Baked, Pumped > 24 hr

S_e (L/s)	P_w (Torr)	Q_{water_vapor} (Torr-L/s)	$Q_{process_gas}$ (Torr-L/s)	Gas Flow Rate (SCCM)
13.705	1.000E-03	9.589E-06	1.370E-02	1.096E+00
13.705	1.000E-02	9.589E-06	1.370E-01	1.096E+01