Applied Ion Systems
Molfow+ Simulations of a Small Scale Multipurpose
High Vacuum System
Facet Parameter Assignments

I. Diffusion Pump Inlet and O-Ring

**Simulation 1: Unbaked System, Pumped for <1 Hour**
Pumping Speed – 600 l/s
Total Outgassing Load (Viton) – $9.708 \times 10^{-5}$ mbar*l/s

**Simulation 2: Unbaked System, Pumped for >24 Hours**
Pumping Speed – 600 l/s
Total Outgassing Load (Viton) – $6.049 \times 10^{-6}$ mbar*l/s

**Simulation 3: Baked System, Pumped for >24 Hours**
Pumping Speed – 600 l/s
Total Outgassing Load (Viton) – $3.774 \times 10^{-6}$ mbar*l/s

II. Adapter Plate 1
Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Aluminum) – $1.066 \times 10^{-6}$ mbar*l/s/cm^2

Simulation 2: Unbaked System, Pumped for >24 Hours
Outgassing Rate (Aluminum) – $1.333 \times 10^{-10}$ mbar*l/s/cm^2

Simulation 3: Baked System, Pumped for >24 Hours
Outgassing Rate (Aluminum) – $6.665 \times 10^{-13}$ mbar*l/s/cm^2

III. Adapter Plate 1 O-Ring and Adapter Plate 1 Top Surface
Simulation 1: Unbaked System, Pumped for <1 Hour
Total Outgassing Load (Viton and Aluminum) – 3.035 x 10^-4 mbar*l/s

Simulation 2: Unbaked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Aluminum) – 7.431 x 10^-6 mbar*l/s

Simulation 3: Baked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Aluminum) – 5.535 x 10^-6 mbar*l/s

IV. Baffle

Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Stainless Steel) – 6.665 x 10^-8 mbar*l/s/cm^2

Simulation 2: Unbaked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – 1.333 x 10^-10 mbar*l/s/cm^2

Simulation 3: Baked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – 3.999 x 10^-13 mbar*l/s/cm^2

V. Baffle O-Ring and Adapter Plate 2 Bottom Surface
Simulation 1: Unbaked System, Pumped for <1 Hour
Total Outgassing Load (Viton and Aluminum) – $3.527 \times 10^{-4}$ mbar*l/s

Simulation 2: Unbaked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Aluminum) – $7.499 \times 10^{-6}$ mbar*l/s

Simulation 3: Baked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Aluminum) – $6.599 \times 10^{-6}$ mbar*l/s

VI. Adapter Plate 2

Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Aluminum) – $1.066 \times 10^{-6}$ mbar*l/s/cm$^2$

**Simulation 2: Unbaked System, Pumped for >24 Hours**
Outgassing Rate (Aluminum) – $1.333 \times 10^{-10}$ mbar*l/s/cm$^2$

**Simulation 3: Baked System, Pumped for >24 Hours**
Outgassing Rate (Aluminum) – $6.665 \times 10^{-13}$ mbar*l/s/cm$^2$

**VII. Adapter Plate 2 O-Ring and Zero Clearance Reducer Bottom Surface**

Simulation 1: Unbaked System, Pumped for <1 Hour
Total Outgassing Load (Viton and Stainless Steel) – $4.484 \times 10^{-5}$ mbar*l/s

Simulation 2: Unbaked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Stainless Steel) – $4.055 \times 10^{-6}$ mbar*l/s

Simulation 3: Baked System, Pumped for >24 Hours
Total Outgassing Load (Viton and Stainless Steel) – $3.140 \times 10^{-6}$ mbar*l/s

**VIII. Zero Clearance Reducer**
Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Stainless Steel) – $6.665 \times 10^{-8}$ mbar*l/s/cm^2

Simulation 2: Unbaked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – $1.333 \times 10^{-10}$ mbar*l/s/cm^2

Simulation 3: Baked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – $3.999 \times 10^{-13}$ mbar*l/s/cm^2

IX. Four-Way Cross
**Simulation 1: Unbaked System, Pumped for <1 Hour**
Outgassing Rate (Stainless Steel) – $6.665 \times 10^{-8}$ mbar*l/s/cm$^2$

**Simulation 2: Unbaked System, Pumped for >24 Hours**
Outgassing Rate (Stainless Steel) – $1.333 \times 10^{-10}$ mbar*l/s/cm$^2$

**Simulation 3: Baked System, Pumped for >24 Hours**
Outgassing Rate (Stainless Steel) – $3.999 \times 10^{-13}$ mbar*l/s/cm$^2$

**X. Gate Valve**

**Simulation 1: Unbaked System, Pumped for <1 Hour**
Total Combined Outgassing Load (O-rings and Stainless Steel) – $2.454 \times 10^{-5}$ mbar*l/s

**Simulation 2: Unbaked System, Pumped for >24 Hours**
Total Combined Outgassing Load (O-rings and Stainless Steel) – $1.652 \times 10^{-6}$ mbar*l/s

**Simulation 3: Baked System, Pumped for >24 Hours**
Total Combined Outgassing Load (O-rings and Stainless Steel) – $1.168 \times 10^{-6}$ mbar*l/s

**XI. Five-Way Cross**
Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Stainless Steel) – 6.665 x 10^-8 mbar*l/s/cm^2

Simulation 2: Unbaked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – 1.333 x 10^-10 mbar*l/s/cm^2

Simulation 3: Baked System, Pumped for >24 Hours
Outgassing Rate (Stainless Steel) – 3.999 x 10^-13 mbar*l/s/cm^2

XII. Viewport
Simulation 1: Unbaked System, Pumped for <1 Hour
Outgassing Rate (Glass) – 1.333 x 10^-7 mbar*l/s/cm^2

Simulation 2: Unbaked System, Pumped for >24 Hours
Outgassing Rate (Glass) – 6.665 x 10^-9 mbar*l/s/cm^2

Simulation 3: Baked System, Pumped for >24 Hours
Outgassing Rate (Glass) – 2.666 x 10^-9 mbar*l/s/cm^2