

Use of Micro-Ion[®] Modules on Vacuum Chambers During Bakeout

Introduction: Testing in Helix's laboratory demonstrated that when appropriately mounted and insulated, the NW16KF flange of a Micro-Ion Module can be baked to 133 °C indefinitely without adverse affects on module operation. A summary of these tests provides guidance to configure Micro-Ion Modules for operation during bakeout.

Test Setup

A heat tape was wrapped around the system port connecting to the Micro-Ion Module. See Figure 1. Then fiberglass insulation was used to cover the connecting port, the Micro-Ion Module and the entire endplate on the Module. See Figure 2.

The Micro-Ion Module was mounted with the digital display face-up. A fan was used to blow cooling air across the bottom of the module enclosure. The cooling air temperature was 30 °C with a velocity at the module of 100ft/min. Thermocouples were used to measure temperatures at various positions in and on the module.

Test Results

After 5 hours of system bakeout and the gauge module reading pressures in the lower 10^{-7} Torr pressure range, the following temperatures were measured:

- External air ambient was 30 °C.
- Temperature at the NW16KF flanges was 133 °C.

- Temperature of gauge wall was 116 °C.
- Temperature of the internal circuit boards was 54 °C.
- Temperature of the top of the module enclosure (display side, opposite the side facing the cooling fan) was 40 °C.
- Temperature of the bottom of the module enclosure (side opposite digital display) facing the cooling fan was 45 °C.

Summary

By maintaining an air velocity of 100ft/min with an air ambient temperature of 30 °C over the Micro-Ion Module, unit operation can be kept well within specifications during a system bakeout to 133 °C. Under those conditions, the module operated as specified with adequate margins to ensure module life is not compromised due to excessive operating temperatures.

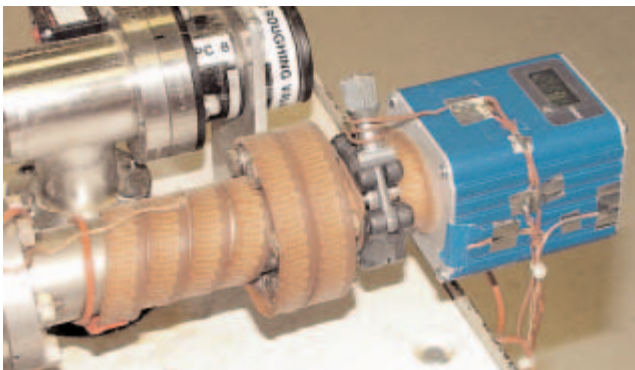


Figure 1. Vacuum system and Micro-Ion Module with heat tape.

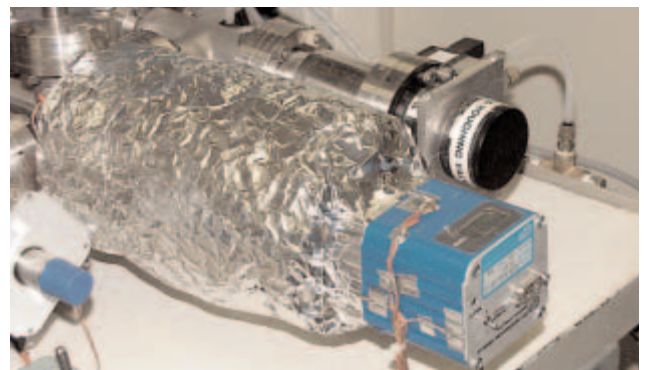


Figure 2. Vacuum system and Micro-Ion Module with heat tape and insulation.

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