

Application Note Number 4: Extorr Dynamic Range

Abstract: The Extorr probe is placed into an ion pumped system and sweeps are taken over a mass range. The dynamic range of the system is displayed as the graph scale is changes to display smaller and smaller peaks.

To give an idea of the sort of dynamic range you can expect with the Extorr, it is placed in a small ion pumped system. As you can see from Figure 1, both nitrogen (or carbon monoxide) at mass 28 and oxygen at mass 32 are in the vacuum system. Changing the gain on the graph (Figure 2), you can see small peaks on the order of 5×10^{-12} torr in the system.

Then the ion pump is turned off and the system pressure is allowed to increase to about 3×10^{-6} torr. The mass sweep from Mass 25 to mass 45 as shown in Figure 3 resulted.

Increasing the gain on the graph display (Figure 4), peaks which are in the order of 5×10^{-12} become visible. So the small peaks represent on the order of a ppm of the total gas.

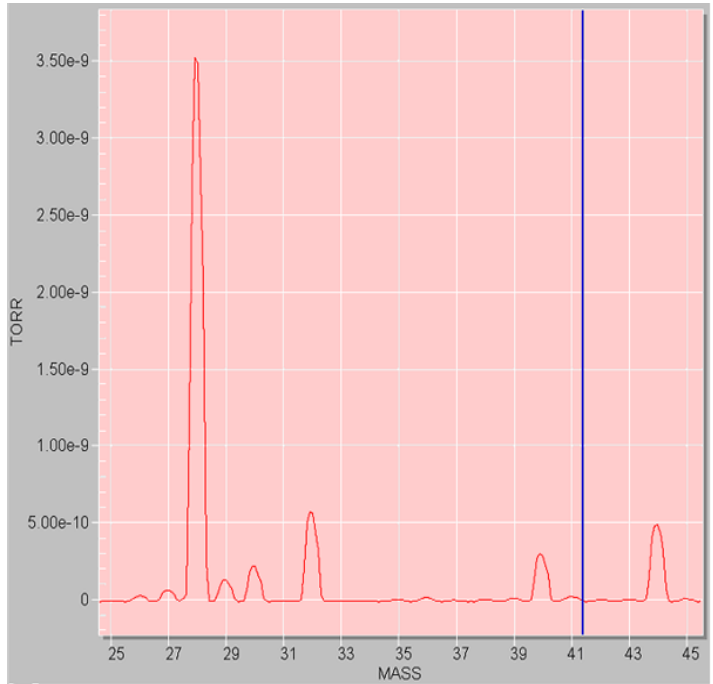


Figure 1

Clearly either N₂ or O₂ are not seen in the system in the ppm range because relatively large amounts were in the background to start with and more were added as molecules came out of the surfaces of the stopped ion pump. Avoiding mass 28 in the background of a stainless steel system is difficult. Avoiding mass 32 is somewhat easier. What this implies is that the limit of detection is determined by the vacuum system not the RGA, even an RGA with the impressive dynamic range of the Extorr.

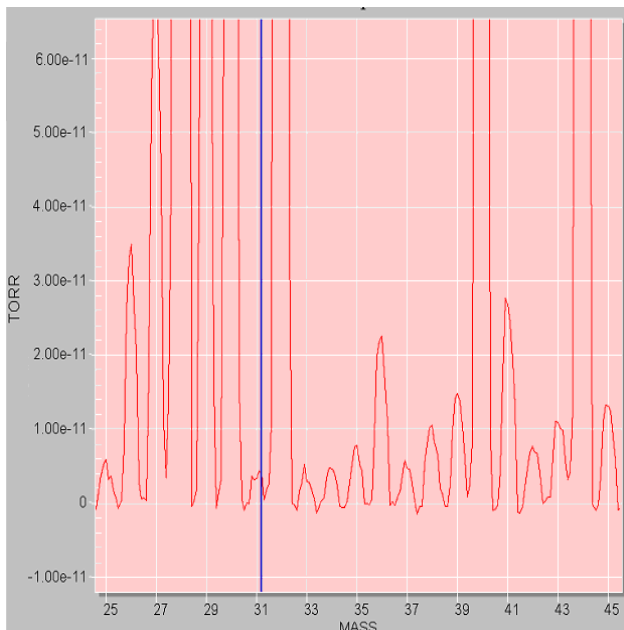


Figure 2

