

A Novel way to combine NEG and sputter ion pump technologies to meet the challenges of UHV-XHV systems

Fabrizio Siviero, Andrea Conte, Luca Viale,
Antonio Bonucci, Paolo Manini, Luciano Caruso, Andrea Cadoppi

Saes Getters S.p.a., Viale Italia 77, 20020 Lainate – Italy¹

Vacuum pumps with larger speed and smaller packages are demanded in a variety of research and industrial applications encompassing surface science, electron microscopy, portable equipments or particle accelerators. To meet this challenge, innovative ways to combine pumping technologies more efficiently or to re-design the pump functionalities are required. One option for UHV-XHV system is to use a Non Evaporable Getter (NEG) pump as the main pump and complement it with a small ion pump to remove inert gases and methane. A novel design for the integration of the NEG and the ion element has been developed and extensively tested. In such a design, a diode ion pump featuring 5 l/s (N₂) is mounted outboard of the getter pump, on the same flange, providing large pumping speed and capacity for gases in a very small package. The design is synergic in that it mitigates the out-gassing from the ion pumps and also increases the ion pump overall absorption performances for argon and methane.

Vacuum characterization, carried out on the pumping performances for a variety of gases of interest for UHV-XHV applications, is discussed in this paper. Pumping speed curves as well as pump down and rate of rise tests have been conducted and in some cases compared with traditional pumping approaches based on large sputter ion pumps. The advantages of the synergic integration of the NEG and the ion pump elements are highlighted and discussed. Examples of applications illustrating how this novel family of pumps can simplify the design and operation of vacuum systems are also presented and critically reviewed.

¹ Tel +39 02 931781, Fax +39 02 93178 460, www.saesgetters.com