Solutions for

Particle Accelerators & Large Vacuum Systems

The extensive use of SAES Getters NEG-based pumping systems for particle accelerators and other large vacuum systems was pioneered by CERN at the time of the design phase of the Large Electron Positron (LEP) collider. The need to provide UHV conditions along the low-conductance accelerator vacuum chamber in order to guarantee the required beam lifetime prompted the use of Non-Evaporable Getter strip. Mounted in a side chamber along the main beam chamber, the NEG strip ran along the entire circumference of the storage ring providing vacuum conditions in the range of 10^{-12} Torr.

Since then, SAES NEG pumps have found widespread acceptance in the accelerator community, allowing the achievement of the most demanding vacuum conditions in low energy heavy ions rings or in storage rings, both for particle physics experiments and for the production of synchrotron radiation.

NEG pumps have also been used in front ends, beam lines, insertion devices, electron sources and systems requiring high differential pumping such as electron cooling and gas-jet targets.

More recently the innovative concept of the NEXTorr has been introduced.

This is a combination pump where a NEG cartridge is integrated with a small ion pump into one, very compact, functional unit. The getter cartridge provides large pumping speed and capacity for gases, acting as the main pump for the removal of active gases (O_2, H_2O, H_2, CO, CO_2, N_2).

The ion pump has the ancillary task of removing ungetterable gases like argon and methane which are not removed by the NEG. These gases are a very small percentage of the gas composition of high or UHV systems, generally dominated by hydrogen and oxygenated gases, so the use of a small ion pump is appropriate and technically well justified.

This design provides in a much more compact package, large pumping speed and capacity for all gases, radically removing the main limitation of NEG pumps.

Another very interesting configuration is the use of the getter material as a sputter deposited layer onto the internal surfaces of an insertion device or a vacuum chamber of an accelerator. The presence of the getter film changes the chamber walls from a gas source to a gas trap and dramatically improves the pressure in narrow gap devices and conductance limited chambers.

This technology, originally developed at CERN, has now spread out and is being extensively used especially in synchrotrons. Over the past 10 years SAES has developed a large experience in the NEG coating technology, delivering coated chambers (under the Integratorr brand name) to most of the machines needing it.

SAES coating facility allows depositing getter films on chamber as long as 6 m.

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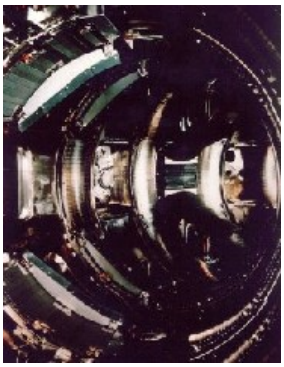

The use of NEG pumping devices in particle accelerators has also prompted their use in other large-size experimental physics machines such as Nuclear Fusion equipment (Tokamak).

In this application SAES NEG pumps, primarily in the form of Getter Wafer Modules and Panels, have been used mainly for their high efficiency to pump hydrogen and hydrogen isotopes.

NEGs are used either directly inside the main vacuum chamber or, more often, in conjunction with ancillary equipment such as divertors or pumped limiters, or in some kinds of diagnostic devices.

Boost your product performance with SAES Getters solutions:

- **NEXTorr**
- **CapaciTorr Pumps**
- **SORB-AC Cartridge Pumps**
- **SORB-AC Getter Wafer Module**
- **IntegraTorr - NEG Coating**
- **St707 Strip**

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