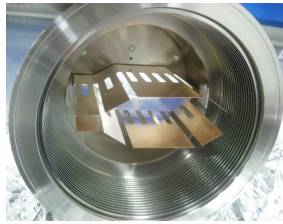
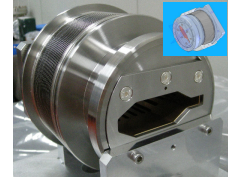


UHV BELLOWS ASSEMBLIES

UHV bellows assemblies are commonly used for guaranteeing reliable movable junctions between different UHV components. The most simple type is composed by two flanges, welded to the bellows convolution, and these convolutions can be edge-welded or hydroformed, depending on the operating mode of the assemblies.



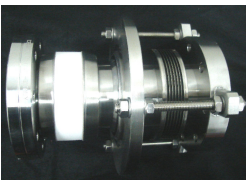
A more complex type of bellows assemblies is represented by the RF-bellows. These devices, normally installed in particle accelerators and storage rings, are used for guaranteeing the electrical continuity along the profile of the beam pipe for any value of the displacement between the inlet and the outlet flange, within the required axial and radial strokes. At this purpose suitable sliding contacts are used. The sliding contacts are composed of two parts: the sleeve (sliding metallic shield) and a group of spring fingers, aimed at maintaining the contact between sleeve and beam pipe. In order to guarantee the RF performances, also the edge flanges are characterized by a special machining, in order to provide a "spigot" coupling, or to allow the installation of RF-contacts. Depending on the application, the required mechanical precision on the RF-coupling can reach 50µm.



CECOM produced several of these components for different Customers in the field of scientific research, also carrying out some specific tests for validating the reliability and the lifetime of the sleeve-finger system.



For several applications the bellows assemblies are attached to special UHV chambers. This is, for example, the case of bellows assemblies that are installed close to steering magnets, where upstream OFHC cooled absorbers and tapered downstream chamber are generally required. When a beam-absorber chamber is attached to the bellows assembly, the cooled absorber can be obtained from a unique block of OFHC copper, vacuum brazed to the pumping pipes, to the bellows, and to the edge flanges. An alternative to this method is to install a cooled inclined copper absorber into a stainless steel chamber, which is TIG welded to the adjacent vacuum components. In this case the cooled absorber assembling can be obtained by means of electron-beam welding, vacuum brazing or explosion bonding. Depending on the chosen solution, the installation of the absorber into the vacuum chamber could require a final TIG welding process. In our experience we optimized the production processes for all these possibilities.



Another special application is represented by the bellows assemblies in which a ceramic break is included. This is in particular important when the electrical or thermal insulation between inlet and outlet flanges is needed. This solution requires a special vacuum brazing process and a high care and experience in the final assembling operations.

CECOM selected MEWASA as partner for the production of bellows. Thanks to this collaboration we can guarantee to achieve the best results in terms of management of the orders and reliability of the production, also providing a more direct availability of the technical data for all components.

References: **CEERN, INFN, CNAO, DLS, Sincrotrone di Trieste, CEA-Saclay, CELLS, SOLEIL, ESRF**