

Semiconductor Industry OEM Relies On The Hope Group for Sub-System Design

A major New England-based Ion implantation system manufacturer determined that its new machine design must meet a more compact footprint and more flexible design criteria to stay competitive. The existing design, which included a separate skid-mounted cooling system, was outdated and no longer cost efficient. Some of the new criteria included a more compact layout, improved cooling capacity, use of de-ionized water, improved portability and integration of new safety and operating controls into the overall system control.

The Hope Group engineers designed a compact cooling system, which included a reservoir, filtration and distribution system to provide cooling throughout the machine, utilizing custom tubing, valves and fittings. To accommodate the new design, a wedge-shaped cabinet was created to fit the new, smaller footprint. Additionally, it had to be portable, as the de-ionized water had to be purged periodically and the cabinet needed to roll away from the main unit while maintaining its connections. A three-stage pump was employed, suitable for use in US and international settings.

This was a de-ionized water skid to provide the required cooling water through components of the system.



Redesign Saves Space and Money

Changing requirements forced a redesign of a de-ionized water skid, which was part of a major manufacturer's product line. The need to operate within a smaller footprint, the need for portability and ease of operation all contributed to the engineering challenge met by the engineers at The Hope Group. The redesign included a three-stage pump sized for 50/60 Hz use with space saving and ease of service in mind.

There was a large pressure drop created through the valves, tubing and components that required cooling during the Ion Implantation process. This required many components for pumping, distributing and controlling the flows. The existing skid did

provide the required conditions but, a separate skid to be placed in close proximity to the Implantation machinery was very costly considering the space was a clean area and the real estate was at a premium in these plants.

Retrofit Solution

The Hope Group put an engineering package together which included a design, and components which would provide a very small footprint system to meet all the requirements of the company. Our customer reviewed the proposal and made some changes and recommendations to more closely meet the specifications they needed. The existing Implantation machine was being retrofitted and revised to accommodate the proposed system along with the tubing and valves required to provide the necessary cooling. The area designated for the new system was triangular shaped and was very small for the required equipment. In addition, it had to be portable for service and had to stand alone for system operation. The safety features and operating controls had to be integrated into the overall existing system control.

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De-Ionized Water Skid

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Sensor Monitoring

De-ionized water requires special component materials so contamination will not affect the integrity of the water.

The water had to be used until the resistivity/conductivity and temperature of the solution went out of a predetermined range. This required special sensors and controls to monitor temperature, flow, pressure and conductivity to respond to the needs of the process. The unit had to be moved out some distance for refilling of new De-ionized water and returned for continuation of the process. This was addressed with specific tubing runs and lengths which The Hope Group also provided with the project.

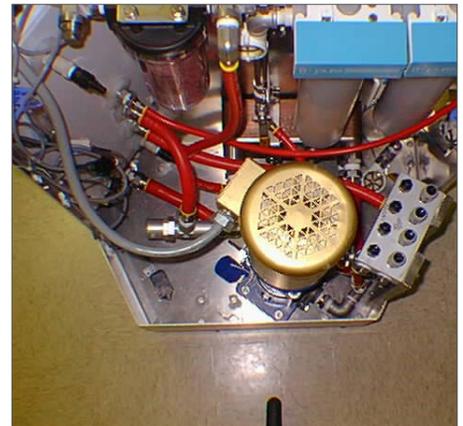
De-Ionized Water System Solution

The Hope Group provided a compact system which contained a reservoir, filtration and all distribution systems for serving many areas of the Implantation system with the water. The cabinet which housed the system was in a critical location and had to have monitors for any water which might have leaked or dripped from the system. This was all wired and condensed into a cable which was connected with the main operating control unit which the customer integrated with the main system. The custom tubing, valves and fittings were kitted and provided the water system to connect to all the components.

The pump had to be a three-stage unit that was large and had to be

engineered for the flow and pressures which varied with the many customers who bought these machines. The system specifications required that the de-ionized system work within a large temperature and electrical range as provided in different parts of the world.

This system as delivered, gave the same cooling water requirements that the original large skid unit provided and with a large cost reduction. The packaged system fit very compact into the Implantation main frame and the manufactured tubing sets were a cost reduction for the installation of the process runs. The power and temperature variables were provided for all customers who purchased the systems without model changes.



Special Requirements Call For Motion and Controls Integration

The system featured a manifold designed to distribute de-ionized water throughout the machine plus pre- and post-filtration and a storage reservoir. De-ionized water requires special component materials so contamination will not affect the integrity of the water. The water had to be used until the resistivity/ conductivity and temperature of the solution went out of a predetermined range. Special sensors and controls to monitor temperature, flow, pressure and conductivity.