7589/SO.21/Nov10

Rolls-Royce

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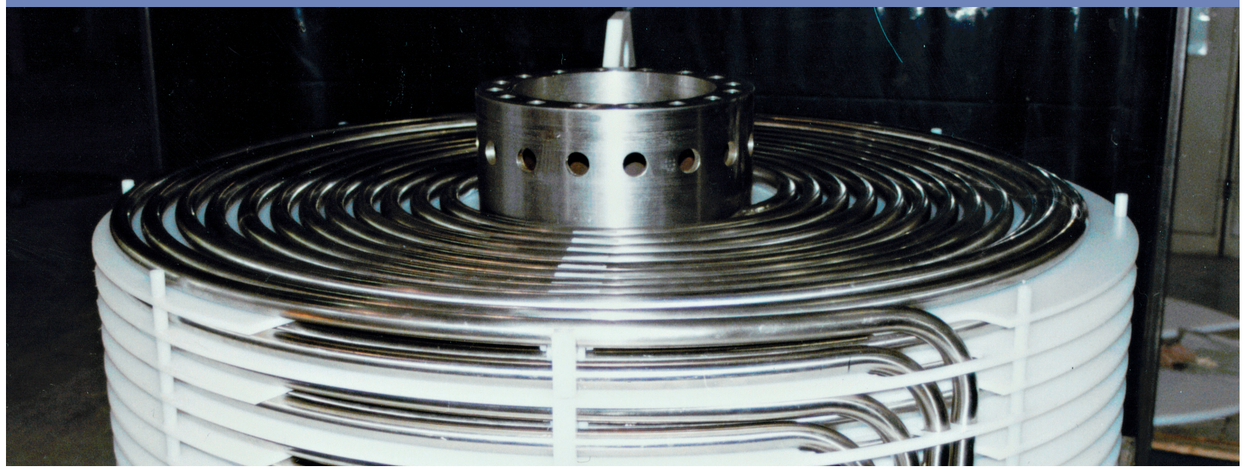
SERVICE OFFERING

Rolls-Royce

Process Systems and Equipment

Mechanical Systems and Component Engineering



Whether unique process components or complete turn-key systems, Rolls-Royce delivers customers a wealth of experience and expertise in nuclear process equipment design and manufacturing.

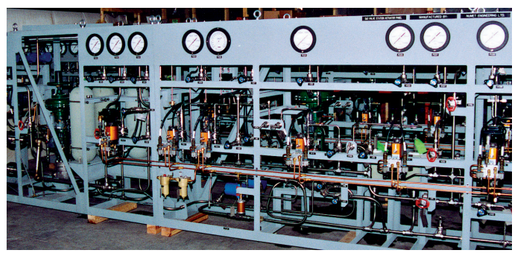
Ease of maintenance, highest integrity, and careful selection of materials are paramount in the nuclear industry. Rolls-Royce has proven experience in supplying process equipment to nuclear power plants all over the world.

We can support our customers at any stage or level, from initial flowsheet concept to detailed design of components to complete turn-key systems, including all supporting analysis and complete control systems. In addition to a full complement of engineers and designers (ASME Code, mechanical, instrumentation and controls), we have a complete manufacturing facility with expertise in welding a wide variety of materials, pipe and tube fitters, and mechanical and electrical assembly. Components and systems can be supplied fully shop tested, including functional and performance testing, to minimize effort on-site.

Demonstrable Experience

Rolls-Royce has a number of "standard" components for which established designs exist (e.g. Y-strainers, drain traps, flame arrestors, sight glasses, flow elements, pipe hangers). These are established, proven components that we've supplied into many systems. They can be tailored to suit customers' specific applications, and can be supplied for a range of nuclear code dates.

An ageing fleet drives the need for plant lifetime extension (PLEX), and the supply of "like for like" equipment can save significant time and effort. Rolls-Royce can apply its knowledge of the nuclear code to the re-engineering and supply of qualified OEM components. This is particularly beneficial to customers in addressing obsolescence challenges, or where the original OEM no longer maintains a valid QA program for supply of nuclear components.



Process Systems and Equipment

The highest quality standards

Rolls-Royce maintains the highest quality assurance standards, with an ASME N-stamp and QA program to ASME NQA-1. In addition to standard ASME pressure vessels, we are experts in application of the ASME Code to a wide variety of process equipment, including heat exchangers, process piping, custom pressure equipment, and skid-mounted systems. Pressures range from full vacuum to thousands of psi, and temperatures of more than 1,000°F. Rolls-Royce is highly qualified in the design and manufacture of vessels and containers for tritium service. These vessels require a very high level of leak tightness (measured in the range of 10^{-9} scc/sec of helium), and are typically subjected to full radiographic examination of all welds. Our inspectors are qualified in accordance with SNT-TC-1A to perform mass spectrometer helium leak testing and NDE to ASME specifications.

Heat exchangers also require special skills in design and manufacturing, including heat transfer design, tube bundle and tubesheet analysis and fabrication, and rolling, welding and examination of tube to tubesheet joints. Our portfolio includes a unique "spiral coil" heat exchanger that provides a very compact design with excellent heat transfer capability, and is scalable to a range of heat exchange duties.

Delivering complete system designs

With in-house expertise in piping systems design, instrumentation, and controls, we're able to provide customers with complete system designs for installation into new or existing facilities. We can become an extension of our customer's own design department, working within their document management systems, to create a virtually seamless interface. Where the existence of supporting documentation for an existing plant is an issue, we can perform an assessment and reconciliation to verify that there are no interface problems between new and existing systems. In addition to design, Rolls-Royce can supply materials, engineered components, and standard piping supports for the systems we design.

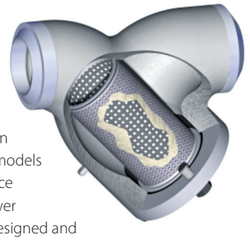
Sometimes, customers require a temporary system or a system to fit into a pre-defined envelope. A skid-mounted system often provides the ideal solution. A packaged system, including process equipment, instrumentation, and controls, provides a clean package for installation and connection. More work can be done off-site, and the system can be factory tested to reduce on-site commissioning effort. We've supplied a number of these systems, utilizing the full range of our capabilities (process design, component specification and design, structural and piping system design, control system and instrumentation). We can work with you at flowsheet development, or strictly utilizing our knowledge of piping system fabrication where a detailed design already exists.

Process Systems and Equipment

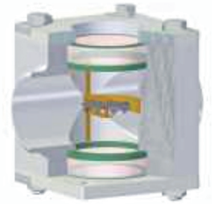
- Standard Components
- Tritium Containers
- Heat Exchangers
- NRU Decontamination System
- Solid-Liquid Separation System
- Vacuum Drying Process Skid System

Supporting Capabilities

Standard Components



These engineered products are backed by 30 years of experience in the application, research, development and testing of these components. During this time, thousands of such components have been supplied throughout the world to more than 25 nuclear reactors. If existing component models do not match your current needs, Rolls-Royce can adapt one of its proven designs to answer your specific application. All products are designed and fabricated in-house to maximize quality control of nuclear products, while minimizing cost and schedule.

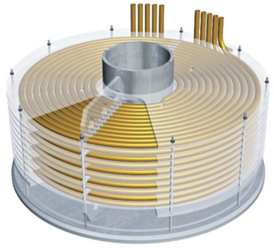


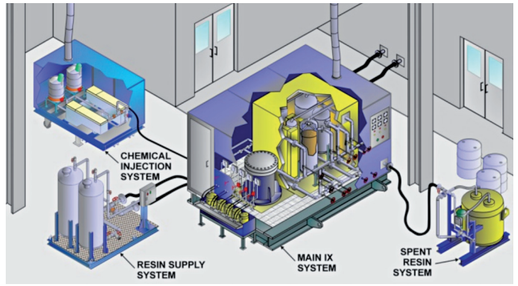
Tritium Containers

The standard immobilized tritium containers house a titanium sponge "getter" for tritium storage in the form of titanium tritide. The ITCs are stainless steel vessels with embedded leak tight valves designed to withstand extreme pressures and elevated temperatures.

Heat Exchangers

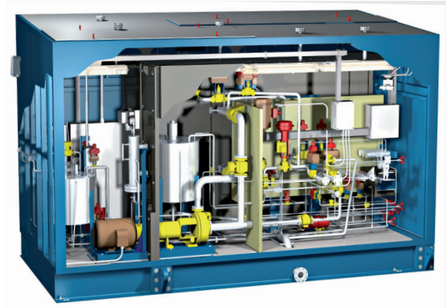
Rolls-Royce provides a unique design of spiral type heat exchangers. These units are very compact and can be provided as bolted or all welded construction. This Rolls-Royce custom product has been supplied to numerous nuclear generating stations, and also to the DOE as part of a process that vitrifies high level radioactive waste.





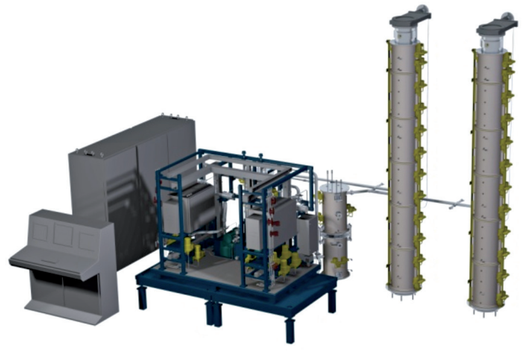
NRU Decontamination System

Using an AECL patented decontamination process, Rolls-Royce designed and supplied this custom system to reduce radiation emissions from the process piping in the NRU reactor at AECL's Chalk River Laboratories facility.



Solid-Liquid Separation System

This Solid/Liquid Separation System was custom designed by Rolls-Royce for use by the U.S. Department of Energy (DOE). It is a cross-flow filtration system that processes a radioactive supernatant feed from underground storage tanks.



Vacuum Drying Process Skid System

Rolls-Royce developed a vacuum drying system to dry used nuclear fuel as part of a large waste management system. The vacuum drying skid provides a mounting platform and houses most of the fuel drying process equipment and instrumentation including the Process Vacuum Pumps, the process and inert gas piping systems, electrical junction boxes, the Residual Gas Analyzers and other process and control instrumentation.