



## CASE STUDY

PROJECT TITLE: **VACUUM CONTAINMENT VESSELS**

CLIENT: **UNITED KINGDOM ATOMIC ENERGY AUTHORITY (UKAEA)**



### AIMS AND OBJECTIVES



Aquila won the contract for the manufacture, assembly and functional testing of a Vacuum Containment Vessel, and a Primary Circuit for a Permeator, for the United Kingdom Atomic Energy Authority (UKAEA).

### ABOUT THE CLIENT



The UKAEA researches fusion energy and related technologies, with the aim of positioning the UK as a leader in sustainable nuclear energy.

Nuclear fusion, the process that powers the Sun, can play a big part in our carbon-free energy future, UKAEA manages the UK fusion programme at the Culham Centre for Fusion Energy (CCFE) which is one of the world's leading fusion research laboratories.



PHOTO CREDIT: UKAEA

## PROJECT OVERVIEW

### SCOPE AND PROJECT SOLUTION

Aquila won the contract for the manufacture, assembly and functional testing of a Vacuum Containment Vessel, and a Primary Circuit for a Permeator, for the United Kingdom Atomic Energy Authority (UKAEA).

Tritium contaminated water is continuously generated in the Exhaust Detritiation Sub-System (EDS) at JET Active Gas Handling System (AGHS). To recover the tritium from the water, the JET Water Detritiation System (JWDS) is currently under construction. JWDS comprises an electrolyser to convert tritiated water into gaseous hydrogen species, a Palladium Permeator for purifying the hydrogen, and two Cryogenic Distillation (CD) columns. The CD columns operate under continuous flow in either series or parallel to isotopically separate the hydrogen and recover the tritium component.

The fabrication required full material and weld traceability and followed UKAEA approval of welding

specifications, welding procedure and welder qualifications.

Aquila fitted their free-issued Permeator, and also connected and tested all the instrumentation associated with the assembly. Testing included dimensional inspection, visual examination, pressure testing and helium leak testing of primary and secondary systems. Following the successful Factory Acceptance testing with UKAEA staff, the equipment was delivered to UKAEA.

#### VACUUM CONTAINMENT FEATURES:

- House the permeator and heat exchanger sub-systems
- Prevent leaks to external atmosphere
- Minimise escape of thermal energy from Permeator
- Reduce heating power required
- Measures engineered to reduce conductive and radioactive heat losses
- Ease of handling, installation and maintenance

### SUMMARY

Aquila took the design specification provided by UKAEA, and worked with Orbital Fabrications to manufacture, assemble and function test the Vacuum Containment Vessel, and Primary Circuit for the Permeator. The simple, practical and cost effective approach resulted in a vacuum containment vessel that enables ease of handling, installation and maintenance.

Pragmatic, cost effective solutions, always



T: +44 (0) 1962 717 000

E: [info@aquilaeurope.eu](mailto:info@aquilaeurope.eu)

[linkedin.com/company/2439808](https://www.linkedin.com/company/2439808)

[twitter.com/aquilanuclear1](https://twitter.com/aquilanuclear1)

Aquila House, Hazeley Enterprise Park,  
Hazeley Road, Twyford, Hampshire  
SO21 1QA, United Kingdom

### ACCREDITATIONS



Aquila Nuclear Engineering is part of  
the Calder Group