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Planning

Production of Hydrodynamic Containment Vessels Strategy

Atomic Weapons Establishment

UK2: Preliminary market engagement notice - Procurement Act 2023 - [view information about notice types](#)

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Scope

Reference

AWE00081

Description

Purpose

AWE Plc is conducting this preliminary market engagement exercise to inform potential suppliers about our future requirements and to gather insights into market capabilities and interest to support our production hydrodynamic containment vessel (vessel) requirements.

The purpose is to engage with suppliers that can assist AWE in developing and refining its understanding of market experience and capability, which will shape the future delivery strategy for vessels ahead of any potential future procurement procedures that follow.

Background

The UK government is fully committed to our independent, continuous at-sea nuclear deterrent, and through its 'triple lock pledge', to delivering the upgrades and programmes necessary to maintain and renew the country's defence nuclear capabilities. The scale and complexity of the work required is a critical National Endeavour and includes substantial investment across the Defence Nuclear Enterprise.

In 2010, the United Kingdom and France, agreed to a series of measures intended to enhance defence cooperation between both countries. This included the signing of 2 new defence treaties, 1 on general defence and security cooperation, and 1 on nuclear cooperation.

Teutates is a joint programme centred around shared radiographic and hydrodynamics research facilities. The initial stages of the programme have focused on the location, specification and construction of required research facilities in the UK and France. As part of the next phase of delivery AWE will define its vessel requirements for the next 10 years.

The vessels will be manufactured and tested in the UK before being shipped to France for operational use.

Requirements

We seek to identify suppliers who can support AWE in strategically defining the manufacture and testing of vessels. The delivery, commercial and procurement model will be informed by the output of the market engagement activities conducted as part of this notice.

There are two types of vessels, named V5X and V6X, which will need to be manufactured and tested. The specific cadence and volume of vessels required is still under development, however we have provided indicative information in line with Treaty durations.

V5X

The V5X vessel is an inverted bell form (approx. final dimensions of OD 1276mm x 1750mm long) mounted vertically within a fabricated carbon steel stand. The Stand and vessel are 2000mm x 2000mm x 2030mm high.

Indicative demand of approximately eight complete manufactured vessels, including components and consumables.

V6X

The V6X vessel is an inverted bell form (approx. final dimensions OD 2200mm x

2615mm) mounted vertically within a fabricated carbon steel stand. The Stand and vessel are 2230mm x 2230mm x 2800mm high.

Indicative demand of approximately 11 machined to final form vessels, including hydrostatic test, components and consumables.

Additional components for manufacture & proof testing

Each vessel will require:

- range of components in order to deliver the capability; and
- hydrostatic and explosive proof tests before it is certified for use. Indicative demand of up to 4 explosive proof tests per year.

Vessel Capabilities

The scope of the vessels is broken into the following activities:

Capability Area 1: Casting & Forging

- a) High quality large volume HSLA HY100 steel casting to ASME VIII Div 3 Code Case 2698 with a single heat (ladle) capable of producing as a minimum 1 bell shaped vessel body and up to 2 representative test blocks of approximately 5 tonnes (t) each. The casting mass allowance needs to consider material excess for all subsequent manufacturing activities and up to 2, representative test blocks of approx. 5t each.
- b) High quality large volume cylindrical castings up to 205t in a single pour activity in SA508-4N steel.
- c) Equipment and processes to forge high quality billets approx. 190t in SA508-4N steel.
- d) High quality sandcast LM25TF Aluminium Alloy casting to BS 1490 with acceptance to SAE-AMS-STD-2175, grade C. Capable of producing as a minimum 2 castings, mass up to 0.05t each, up to 900mm diameter and 60mm thick, as a single pour. The mass allowance needs to consider material excess for runners, risers and subsequent machining. The all up melt mass for two 0.05t castings has been in the order of 0.25t.

Capability Area 2: Quality Heat Treatment

- a) Quality heat treatment facilities and processes e.g. furnaces, handling equipment, quench tanks etc, suitable for a V5X cast HY100 bell-shaped vessel and test blocks. Note test blocks must be quality heat treated alongside the vessel body to be deemed representative.

b) Quality heat treatment facilities and processes to attain the material properties required of cast LM25TF aluminium alloy to BS1490 for a minimum of 2 identical cast items and one set of BS1490 standard test specimens per heat treatment.

Capability Area 3: General and Precision Machining

- a) General machining of large volume, large mass metal objects up to 80t.
- b) High precision milling and turning activities to achieve tight tolerances over large dimensions. e.g. typical $\text{Ø}1057.25 \text{ mm} \pm 0.25\text{mm}$.
- c) High precision machining on pressure and non-pressure equipment in steel, stainless steel and aluminium alloy materials.
- d) Vertical turning lathe (VTL) with turn activities up to 100t to a strict set of tolerances.
- e) High precision machining of aluminium alloy castings (typical size 800mm) to 0.06mm

Capability Area 4: Metallic Fabrications

- a) Large steel fabrications to tolerances typically better than $\pm 3\text{mm}$ per metre.

Capability Area 5: Welding

- a) High quality welds of steel structures typically 50mm thick with structure including post weld heat treatment and weld inspection.
- b) High quality (square butt) welding of stainless-steel pipework forming parts of pressure systems.
- c) Approval testing of welding procedures and operators shall be conducted, recorded and reported in accordance with BS EN ISO 15614-1 and BS EN ISO 1606-1.

Capability Area 6: Wiring, Looms, Cabling Assemblies

- a) Manufacture of individual cables, assemblies and looms that may form part of a pressure boundary.
- b) Experience of using electrical feedthroughs in pressure boundaries.
- c) Electrical testing of individual cables, assemblies and looms. This testing will include:
 - Insulation resistance

- Continuity
- HV withstand
- Inductance measurement.

Capability Area 7: Pressure/Gas Systems

- a) Manufacture of bespoke pressure / vacuum components to build to print drawings
- b) Pipe bending to build to print drawings. For example, 9.5mm stainless steel tube.
- c) Assembly of gas systems using bespoke and COTs components to Build to print drawings
- d) Pressure and Vacuum leak testing between 0- 118 bar absolute with Helium and leak rate of 1×10^{-7} mbar.l/s.
- e) Trained and experienced in helium leak testing for NDT purposes.
- f) Trained and experienced in proof pressure testing in accordance with HSE Guidance Note 4: Safety in Pressure Testing (GS4).

Capability Area 8: Fibre Optic Connectors

- a) Manufacture of a sealed fibre optic connector that can withstand pressure and shock loading.
- A minimum of 16 cores and maximum 32 cores
 - A power loss of less than 0.5 db
 - A design pressure of 82 bar.

Capability Area 9: Stripline Connectors

- a) Manufacture of a sealed stripline connector that can withstand pressure (82 bar) and shock loading.
- b) The electrical characteristics will include:
 - High voltage that withstands up to 12kv
 - Current of up to 5kA

- Inductance of less than 10nH.

Capability Area 10: Fasteners and Seals

a) Manufacture of high-quality screws, bolts and nuts:

- Product forms in accordance with British and ISO standards (e.g. BS 3692, ISO 4761)
- Manufacture, properties and testing in accordance with British and American standards (e.g BS EN ISO 898-1 & 2, ASTM A193)
- Mechanical and chemical testing, and volumetric inspection of bar stock prior to manufacture
- Batch testing of fasteners in accordance with the specified manufacturing standards to demonstrate properties of finished product.

b) Manufacture of high-quality vulcanised Hydrogenated Nitrile Butadiene Rubber (HNBR) "C" seals, O and X-rings and Ethylene Propylene Diene Monomer (EPDM) rubber "C" seals and O-rings.

- Rubber hardness testing in accordance with BS ISO 40 Method N
- Rubber tensile strength and elongation testing to BS ISO 37 (Type 2 dumb-bells)
- Rubber compression set testing in accordance with BS ISO 815-1 (Type B buttons).

Capability Area 11: Hipping/Special Processes

a) Hot Isostatic Pressing of components of approx. dimensions Ø1330 mm x 2080mm tall and approx. mass 27t with associated test block(s). Note Test blocks must be HIP'ed in the same HIP process as the actual item they represent.

Capability Area 12: Glass Work

a) Supply of BS EN 572 float glass components up to 1100mm 500mm x 12mm, with central holes and bevelled edges.

Capability Area 13: Explosive Testing

a) Explosive trials with commercially available PE4 explosive up to and including 31.25 kg TNTeq. Note for this purpose AWE employs a TNT equivalence factor of 1.25 for PE4.

b) Ability to undertake open range arena and tube trials with high fidelity data capture.

c) Ability to undertake vessel trials within a weatherproof facility with high fidelity data capture.

d) Ability to clean out vessels once a trial has been conducted.

Capability Area 14: Material Testing

a) Tensile and Charpy impact testing to demonstrate mechanical properties of cast and wrought steels and aluminium alloys

b) Mechanical testing shall be carried out in accordance with ASME VIII Div 3 Article KM-2 and ASTM A370-22.

c) Non-Destructive Testing (dye penetrant, ultrasonic, X-ray, magnetic particle) on raw material stock (steels and aluminium alloys), cast and forged steel components, and cast aluminium alloy components.

Capability Area 15: Managed Service

a) Ability to manage the full end to end process for the manufacture of V5X and V6X vessels.

Contract dates (estimated)

- 1 July 2026 to 31 December 2035
- 9 years, 6 months

Main procurement category

Goods

CPV classifications

- 31000000 - Electrical machinery, apparatus, equipment and consumables; lighting
- 32560000 - Fibre-optic materials

- 42000000 - Industrial machinery
- 43700000 - Machinery for metallurgy and associated parts
- 44500000 - Tools, locks, keys, hinges, fasteners, chain and springs
- 71317100 - Fire and explosion protection and control consultancy services
- 71630000 - Technical inspection and testing services
- 73200000 - Research and development consultancy services
- 73400000 - Research and Development services on security and defence materials
- 75220000 - Defence services

Contract locations

- UK - United Kingdom
- FR - France

Engagement

Engagement deadline

18 August 2025

Engagement process description

Suppliers who wish to participate in this pre-market engagement will be required to submit a proforma and a signed Non-Disclosure Agreement (NDA) as part of the process. Firstly, suppliers are invited to register your intent to supply an Expression of Interest (EoI) by contacting this address teutatescommercial@awe.co.uk, including in the subject of your email "Hydrodynamic Containment Vessels" and quoting the reference number "AWE00081".

Suppliers will then be provided a copy of the proforma, NDA and response template, which will need to be completed and returned as part of your EoI submission. The submission of your NDA does not constitute a complete and approved NDA as the NDA will need to go through internal processes and approvals. We will let you know the outcome of your NDA post EOI submission.

Responses should be emailed to teutatescommercial@awe.co.uk by the deadline of 18th August 2025.

Following receipt of an EoI AWE will need to countersign and return the NDA before commencing any follow-on pre-market engagement activities. AWE will issue a further Market Request for Information (RFI) based on the specific response to the capability areas you have expressed an interest for. This will explore in more detail relevant market attributes covering contracting and commercial models, solution types and capacity to deliver outputs required. Dependant on the extent of market response, AWE will also arrange more interactive supplier engagement activity to including a briefing session and/or direct dialogue. There will also be a request for suppliers to evidence their authority/regulatory compliance to contract with AWE and in the UK as part of these engagement activities.

All information and material collected from these pre-market engagement activities will be documented and may be subject to public disclosure in line with UK Public procurement regulations, respecting commercial confidentiality.

Expressions of interest and participation in the pre-market engagement activities does not preference or preclude participation in future tender activities in this project.

Participation

Particular suitability

Small and medium-sized enterprises (SME)

Procedure

Special regime

Defence and security

Contracting authority

Atomic Weapons Establishment

- Public Procurement Organisation Number: PYCH-2579-LGTN

AWE Aldermaston

Reading

RG7 4PR

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Organisation type: Public authority - central government