

CORRIGENDUM EX ANTE PUBLICITY (POINT 2 OF ANNEX I OF GFR):
**NEGOTIATED PROCEDURE TO BE LAUNCHED BY FUSION FOR ENERGY
FOR A VALUE BETWEEN EUR 15 000 AND EUR 139 000**

Procedure reference:	F4E-OPE-1081
Title of the procedure:	Manufacturing of Blanket Manifold Welded Supports
Background information	<p>The above-mentioned procedure concerns the manufacturing of several prototypes of the so-called “welded supports” of the inboard bundles of the Blanket Manifolds.</p> <p>The procurement of the Blanket Manifolds will be part of the call for tender F4E-OMF-1080, to be issued later this year and for which a prior information notice was published on 29/05/2020.</p> <p>The main functions of the Blanket Manifolds are:</p> <ul style="list-style-type: none"> • To supply cooling water to the Blanket System inside the Vacuum Vessel; • To contribute to the nuclear shielding to the Vacuum Vessel other components; <p>The Blanket Manifolds consists of 363 cooling circuits feeding 440 Blanket Modules which are routed through 18 Upper Ports and 2 lower ports into and out of the Vacuum Vessel, as shown in Figure 1. Most of these circuits are connected to individual Blanket Modules, some feed two or Blanket Modules. Both inlet and outlet pipes of the cooling circuit are hydraulically joined to the rear side of Blanket Module via a connector located in dedicated recesses in the modules. The pipe bundles are usually similar around the Vacuum Vessel. There are however difference in three distinctive designs: the standard, the Neutral Beam Injector (NBI) area and the Vertical Stability (VS) coil feeder region.</p> <p>There are about 8.5 km of 316L stainless steel pipes (OD = 48.3 x 2.7 mm, 60.3 x 2.7 mm) and about 2000 pipe supports in total.</p> <p>There are three support designs under consideration:</p> <ul style="list-style-type: none"> • Hot Radial Pressing (HRP) = Baseline Design; specialized process, applicable in inboard and outboard bundles. • Bolted Design = manufactured by machining, only suitable for Inboard and Upper Port. Requires high strength alloys when used in inboard bundles. • Welded Clamshells = Clamshells pressed against pipes and welded; applicable in inboard bundles and possibly in some outboard locations. <p>The demonstration of the technical adequacy of the welded design is still ongoing and is partly under the scope of the upcoming procedure F4E-OPE-1081, which is related to the development and validation activities of this welded clamshells concept.</p>

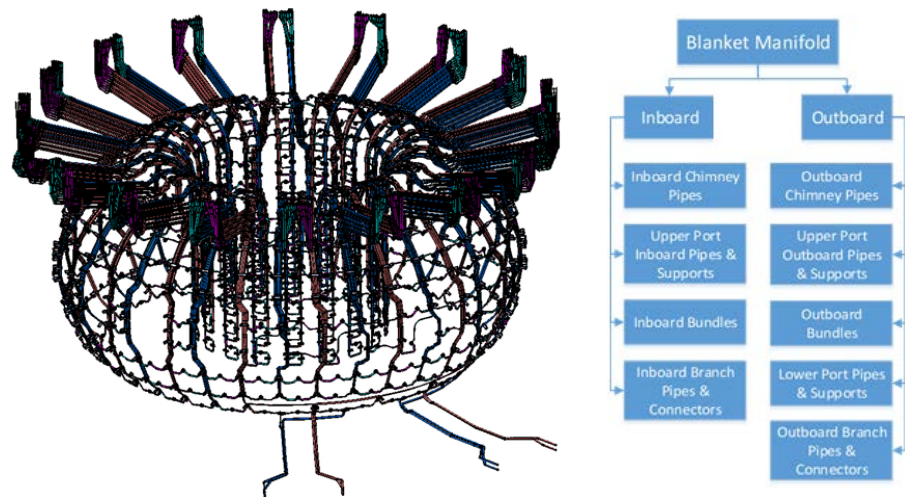


Figure 1: Blanket Manifold Top Level Breakdown Structure

Given the 9 Vacuum Vessel sectors (40°) and 18 Upper Ports, the Blanket Manifolds are arranged in 20° arrays with 10° toroidal span between the inlet and the outlet bundles, as shown in Figure 2. The Inboard bundles are routed in dedicated cut-outs within the Blanket Modules while the Outboard is routed in recesses between adjacent Blanket Modules.



Figure 2: Standard 40°, 20° sector and individual circuit

scope of the procurement

The scope includes the manufacturing of several prototypes of the so-called “welded supports” of the inboard bundles of the Blanket manifolds. These prototypes will be submitted subsequently (outside of the scope of this procedure) to destructive and non-destructive examinations and testing financed under other F4E contracts.

The welded supports have a modular design and are assembled together by TIG welding. One support type is made with U shaped clamshells and the other is made with L shaped clamshells.

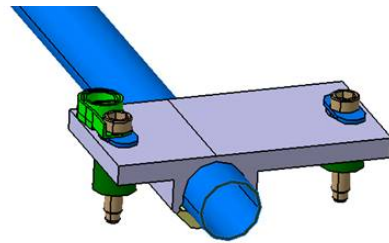
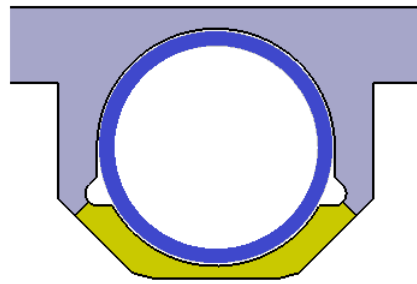


Figure 1: Inboard Support #1 - U-Shape Design

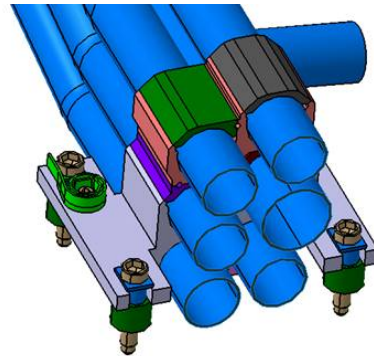
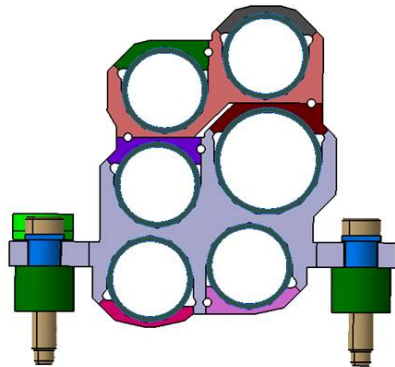


Figure 2: Inboard Support #12 - U-Shape Design

The material of the clamshells and pipes is stainless steel 316L. An alumina coating of about 0.3mm will be applied on the inner surface of the clamshells in order to electrically insulated the pipes from the supports. In certain cases, the alumina coating could be covered by a copper coating of about 0.1mm to improve the thermal conductance between pipe and support. In theory, the coating could be applied on either the pipe or the clamshells. In the present contract, the coating will be applied on the clamshells, not on the pipes. The inner diameter of the clamshells will be selected by the supplier to suit the pipe outside diameter taking the thickness of the coating into account.

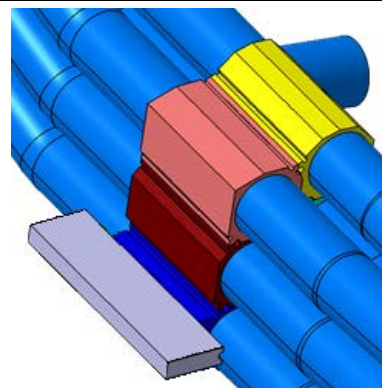
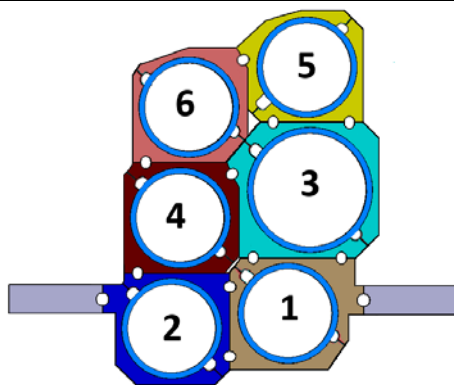


Figure 3: Support #12 - L-Shape Design

Two pipe sizes will be used: outside diameter = 48,3mm x 2.77mm thickness and outside diameter = 60,3mm x 2.77mm thickness. The pipe pieces will be 600mm long.

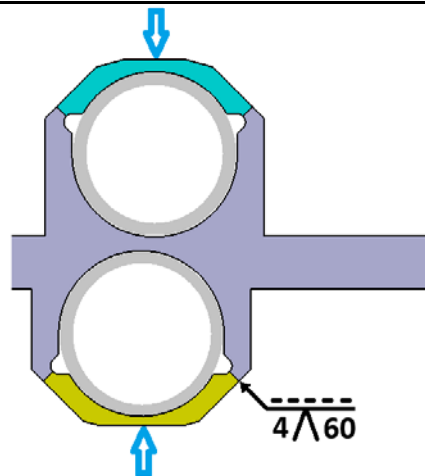


Figure 4 (a):
Welding of U-shape Clamshells

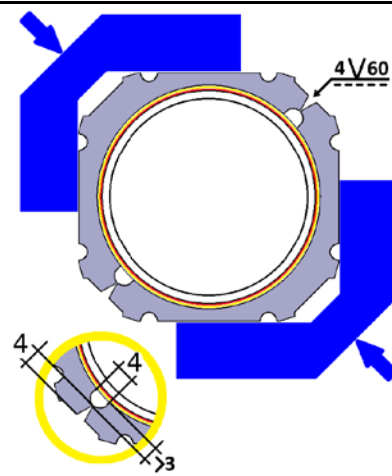


Figure 4 (b):
Welding L-Shape Clamshells

Once the clamshells and the pipes are manufactured and coated, the supplier will perform the welding using the TIG process. The joints between clamshells will be adapted as required to suit this welding technique. In order to maximize the thermal conductance between pipes and supports, the clamshells will be pressed against each other with a forced of the order of 30kN during welding. The exact value will be specified by F4E in due time. The supplier will design and manufacture this clamping device.

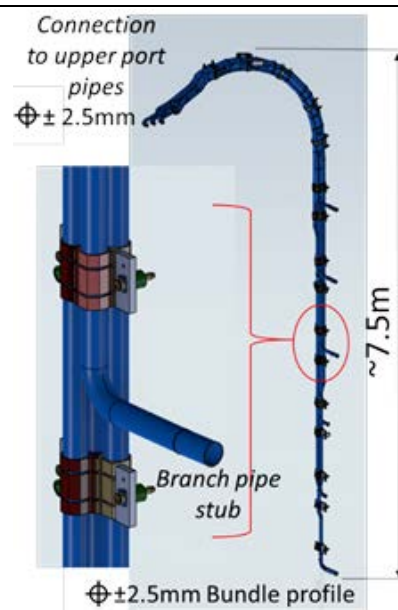


Figure 3 (a): Inboard inlet bundle
(16 supports)

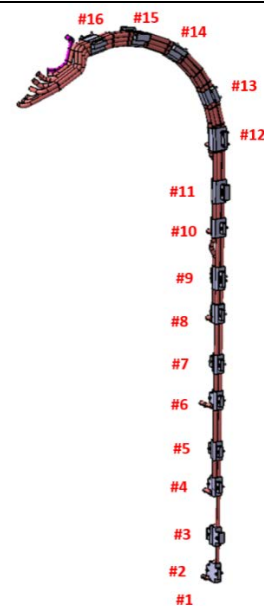
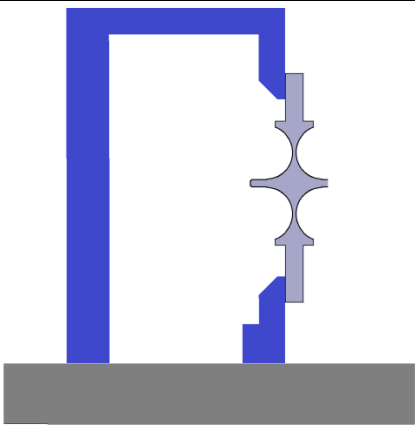
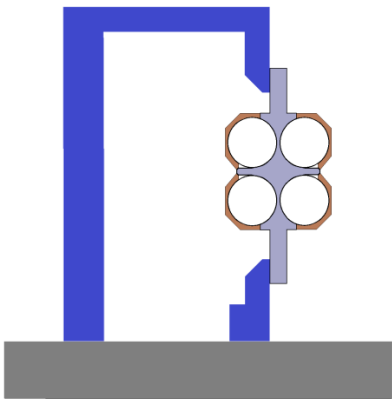


Figure 3 (b) : Inboard outlet bundle
(15 supports)

		
	Figure 4 (a): Manufacturing jig	Figure 3 (b) : Manufacturing jig
	<p>Under this contract, the supplier will prepare a report containing the description of the processes used. The lessons learned from the prototypes manufacturing will be documented and suggestions for improvement will be made.</p> <p>The supplier will compare the two support types and make a qualitative comparison of their feasibility from the technical and economical point of view. Included in the scope is the development of a conceptual design of a jig to manufacture a full inboard bundle.</p>	
Technical documents for information:	<p>The full set of tender documentation, including the final technical documents, will be sent to the candidates that have manifested their interest. Some minimum selection criteria will be established in the call for tender. The invited candidates may be requested to prove during the call for tender their technical and financial capacity.</p> <p>Evidence of exclusion and selection criteria will have to be provided by the successful tenderer before signature of the contract.</p>	
Candidates to be invited ¹ :	<p>Only interested candidates that have provided an explanation on how they meet the selection criteria will be invited to tender. If you have submitted interest in the previous publication, please confirm this interest since the level of detail provided in this publication is higher and the selection criteria have been further detailed, taking into account Fusion for Energy's needs in view of its procurement strategy, as mentioned under section "Background information".</p>	
Exclusion criteria:	<p>The exclusion criteria are listed under Art. 136 of the General Financial Regulation (GFR)</p>	
Selection criteria ² :	<p>a) Capability in geometry control of piping through mechanical or thermal forming;</p> <p>b) Machining and welding of stainless steel parts approximate maximum size 400mmx400mmx200mm with tight tolerances (+/- 0.01mm);</p>	

¹ A minimum of 3 candidates will be invited for contracts below EUR 60 000 and a minimum of 5 candidates for contracts between EUR 60 000 and EUR 139 000. Only preselected candidates will be invited to negotiate. If you register as interested candidate you will be informed when the call is launched.

² The selection and exclusion criteria may be verified during the procurement procedure and evidence may be requested to be provided. Reception by a candidate of the F4E Invitation to tender does not imply that the candidate complies with the selection criteria.

	<p>c) Application of alumina and copper coatings; for alumina coating the application shall be by Detonation Gun, High frequency Pulse Detonation, or equivalent.</p> <p>d) Design experience of devices, jigs and tooling ;</p> <p>e) Experience of manufacturing of component of representative size (longest dimension = 8m).</p>
Indicative schedule for the procedure	<ul style="list-style-type: none"> - Indicative date to launch the call: 29/07/2020 - Indicative date for contract signature: end of September 2020
Procurement documents:	The set of tender documents will be sent to the interested candidates who have provided an explanation on how they meet the selection criteria.
Deadline to submit interest to participate:	21/07/2020
Address to submit interest to participate ³ :	roberta.rubbino@f4e.europa.eu
Participation	Only candidates from F4E Member States ⁴ will be invited.
Questions and answers:	Questions concerning the submission of an interest to participate shall be sent by email and addressed to the persons mentioned under “address to submit interest to participate” (Roberta.Rubbino@f4e.europa.eu)
Other information:	<p><u>Your interest to participate should include as a minimum:</u></p> <ul style="list-style-type: none"> - The name and registered address of your company, the details of the contact person(s) and a brief description of the experience of your company related to the mentioned scope; - An explanation on how your company meets the selection criteria. - A declaration on whether your company is also interested in participating to the procedure F4E-OMF-1080 for the procurement of the Blanket Cooling Manifold, as described under section “Background information”. <p>Please note that participation to this procedure does not imply any conflicting situation in regards to the participation to the future procedure mentioned under section “Background information”. All the information produced as outcome of this procedure will be made available in due time to all companies interested in participating to the above-mentioned future procedure F4E-OMF-1080.</p>

³ Your interest to participate should include as a minimum the name and registered address of your company, the details of the contact person(s) and a brief description of the experience of your company related to the mentioned scope.

⁴ The F4E Member States are the EU Member States and Switzerland.