

Headline

Cryogenic system en route to Japan



Cryogenic system components being loaded onboard ship at the harbour of Antwerp in Belgium

On 18 January 2015 the vessel "M/S Annemieke" took on board 40 packing cases from Air Liquide Advanced Technologies (AL-AT) in France comprising all major components of the cryogenic system. The vessel left the harbour of Antwerp and will arrive at Hitachi port in Japan in about two months' time. Although the packing cases have a total weight of 242 t and occupy a total volume of 930 m³ they fill only a small fraction of the vessel's capacity (see photo). The biggest units are the refrigerator cold box (RCB) with dimensions of about 14x4x4 m³ and the auxiliary cold box (ACB) with 13x4x4 m³ with a weight of about 70 t each.

The transport is arranged taking account of the limited desirable arrival time window suitable for the further ground transportation in Japan, between late March and early April, as well as the strict size constraints to be able to dock in a dedicated berth at Hitachi port. These constraints could be met only by a few special vessels. The selected vessel does not travel directly to Japan but makes about ten intermediate stops on the way. After collecting goods along the North Sea and the Bay of Biscay, the vessel will pass through the Mediterranean Sea and the Suez channel, stop in India, Malaysia, and Singapore, stopping again at different harbours along the Chinese coast, before it finally approaches Japan. At Hitachi port a specialised freight forwarder was contracted by JAEA to unload the units and transport them to the Naka site. Assembly on-site will be performed by AL-AT together with their Japanese partner, Air Liquide Engineering Japan (ALEJ) and local subcontractors.

The start of the installation was authorised by Ibaraki Prefecture. In order to enable JAEA colleagues to issue the corresponding request note, AL-AT has prepared and submitted a comprehensive set of documentation.

From the middle of March 2015 until the summer of 2016, teams of engineers and technicians from AL-AT, ALEJ, CEA, and F4E will coordinate and supervise the on-site work in Naka, and they have already started preparation of their stay in Japan.

News

Work Site Survey Meeting for cryogenic system



Work Site Survey Meeting

The cryogenic system procured in Europe is provided by CEA France, through their contractor Air Liquide Advanced Technologies (AL-AT). The cryogenic system consists of the warm compressor station, the refrigerator cold box (RCB), and the auxiliary cold box (ACB), with their vacuum pumps, cryogenic transfer lines for helium and nitrogen, interconnecting piping, as well as a supply for compressed air, and gaseous helium storage (the latter provided by F4E). Most components will arrive at the Naka site in April 2015, followed by their installation and testing until mid-2016.

The formal agreement detailing roles and responsibilities of the on-site activities for the cryogenic system was signed in November 2012. In accordance with the agreement, the Work Site Survey Meeting (WSSM) for the cryogenic system was held at the Naka site, from 10 to 12 December 2014. The purpose of the meeting was to agree on the safety, working principles, interfaces, and communication among all parties involved during the execution of on-site work. The on-site-organisation and the safety guidelines and command chain between the JAEA on-site safety manager (JAEA OSM), the F4E on-site representative (OSR) and safety officer (SO), the EU-VC (CEA) OSR and SO, and the supplier (AL-AT) were presented and agreed. In addition, the training foreseen for European workers was presented. During the site tour the participants visited the new buildings under construction by JAEA, and agreed on the location of working areas, temporary storage places and offices.



Site tour at the Naka site

News

Cryogenic system site preparation progressing well



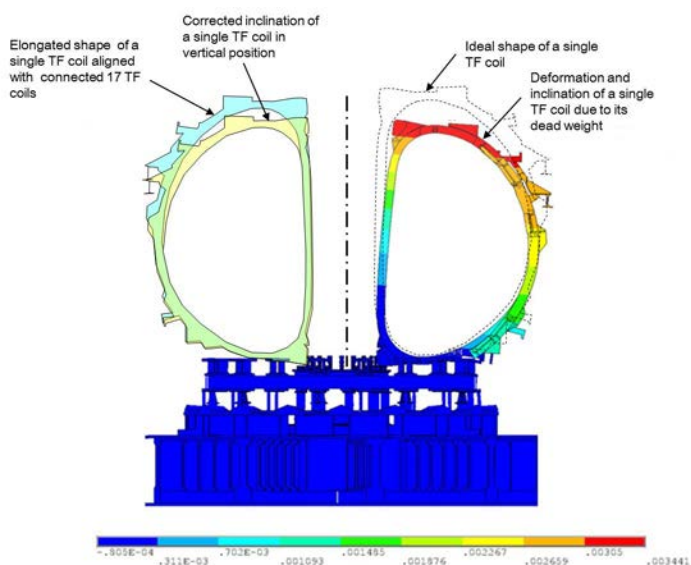
The on-site preparation work for the cryogenic system at the Naka site is being accelerated to catch up with the delivery of its components expected in spring 2015.

For the construction of the warm compressor station (WCS) building, the concrete emplacements of the walls and floors have been completed, and painting etc. inside the building is now in progress. In addition, the outer wall construction and the installation of high voltage incoming panels have also been completed.

For the outdoor work, the liquid nitrogen tank has been relocated after the completion of the tank yard foundation carried out last year. In parallel, the foundation of the helium storage tanks has been constructed and the position of the stud bolts which fix the helium tanks, and the flatness of the concrete surface, have been measured after the completion of the construction. The results of measurement will be used for the final adjustment to the supports of the tanks.

News

Shape correction method for a single TF coil defined



TF coil deformation in assembly (exaggerated scale)

During the assembly of a single toroidal field (TF) coil, deformation is likely to occur as shown in the figure: depression due to its dead weight, and outward in-plane rotation due to the low stiffness of the temporary support in the lower part. Such characteristics need to be considered in particular for installation of the last (18th) TF coil.

Since the first 17 TF coils will be toroidally connected, their stiffness will be stronger than that of the single 18th TF coil, and as a result, the depression due to their dead weight will be reduced. When the connected 17 TF coils and the 18th TF coil are brought together however, there will be a few mm misalignment (allowable misalignment: within ± 1 mm), which makes the assembly difficult.

To correct the alignment, the following shape correction method has now been defined: the depression will be adjusted by taking some of the weight of the single TF coil by an appropriately placed crane and chain block, while adjusting the outward rotation using a jack.

News

Progress of VV port manufacturing



Figure 1: Completed horizontal port



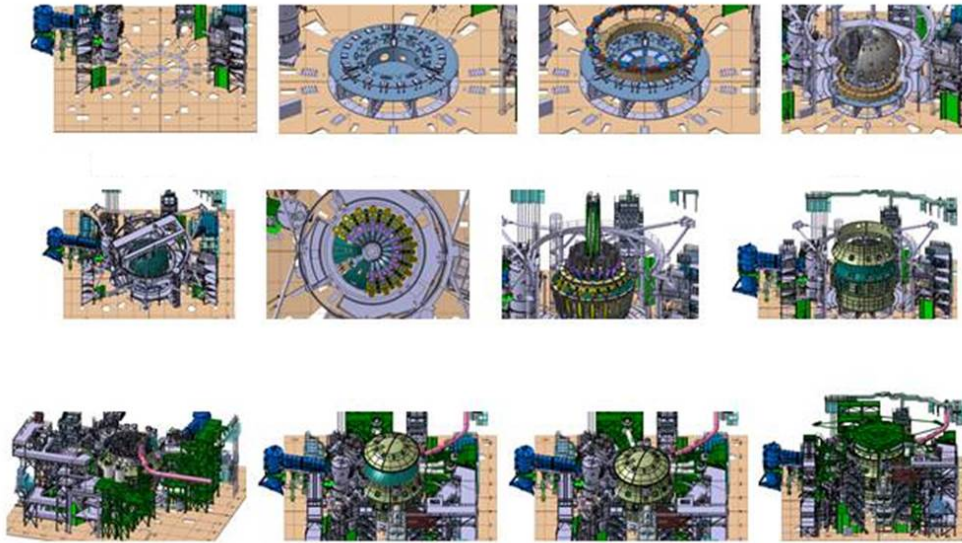
Figure 2: Horizontal port after bending

The vacuum vessel (VV) port manufacturing has made progress. 5 horizontal ports with reinforcement rib and 6 diagonal ports have been completed and delivered to the Naka site by the end of December 2014 (Figure 1). A total of 24 ports, including the 13 ports (12 vertical ports and 1 horizontal port) whose delivery started in August 2014, have been completed.

The electron beam (EB) welding, of the remaining 7 diagonal ports and 4 out of 6 horizontal ports, was completed and they are now undergoing groove alignment. The bending of the remaining 2 horizontal ports was completed and the EB welding will be performed in the near future (Figure 2).

News

JT-60SA assembly animation updated



Still images from the animation of tokamak assembly

The latest [animation of tokamak assembly](#) has been uploaded under “Movies” in the multimedia section of the JT-60SA public web site.

A total of 555 original 3D CAD images were used to create the animation, which includes assembly reference point setting, followed by assembly of the cryostat base, poloidal field coils, vacuum vessel, thermal shields, toroidal field coils, central solenoid, cryostat vessel body, coil terminal boxes, cryolines, cryostat top lid, instrumentation frame, etc. (see figure.)

Furthermore, the 3D animation can be used as an important tool in the actual assembly work to visually confirm the detailed assembly procedures. It is also considered to be useful for future reactor designs.

Local

Praying for JT-60SA construction safety at Shizu Shrine



Main gate of Shizu Shrine



JT-60SA participants



Praying for safety in Shinto worship style

On 27 January 2015, a total of 35 JT-60SA participants, including 19 from JAEA, 3 EU workers who are working for the quench protection circuit installation at the Naka site, and 13 from Japanese manufacturing companies, visited the Shizu Shrine in Naka to pray for safety on the JT-60SA construction site.

A Shinto ritual was performed in the main hall of the shrine by a Shinto priest who led the participants to pray for safety and success on the JT-60SA construction site in the Shinto worship style, which is to offer Sakaki (*Cleyera japonica*, a sacred tree in Shinto) to the god, clapping hands and bowing, and receiving Omikil (sacred Japanese sake offered to the god).

The Shizu shrine is very old (established in 806 A.D.) and has a long and distinguished history. Many people come and visit the shrine where various Shinto rituals are performed in events such as at the New Year period, the spring festival, etc.

Calendar

March 17, 2015

16th Meeting of the STP Project Committee (PC-16)
Naka, Japan

April 20, 2015

Celebration of the delivery of the main components and start of their on-site installation by EU, and completion of the initial assembly of the vacuum vessel of the JT-60SA tokamak
Naka, Japan

April 21, 2015

16th Meeting of the BA Steering Committee (SC-16)
Naka, Japan

April 22 – 23, 2015

22nd Technical Coordination Meeting (TCM-22)
Naka, Japan

May 17 – 21, 2015

23rd International Conference on Nuclear Engineering (ICONE-23)
Chiba, Japan

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team.
Suggestions and comments are welcome and can be sent to newsletter@jt60sa.org.

For more information please visit the website: <http://www.jt60sa.org/>