



ESS
bilbao



**EUROPEAN
SPALLATION
SOURCE**

ESS Target Design progress

Consorcio ESS-BILBAO & Instituto de Fusión Nuclear & ESS-AB

ESS Bilbao Team

August 29th, 2018

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Introduction

Introduction

ESS-Bilbao Workpackages

The total budget for ESS Target station is ~ 150 M€. ESS-BILBAO Consortium has been chosen as ESS partner for $\sim 12-16$ % of the Target Station project.

Work Package	KO meeting	Delivering date
Target Wheel & Shaft & Drive Unit	Jan-2015	Apr-2019
Proton beam entrance window	Apr-2015	Feb-2018
Tuning beam dump	Apr-2015	Feb-2018
Monolith vessel	Jun-2015	Feb-2018
TOTAL	17.9 M€	

Target: Spallation Material and internal structures

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Progress to the plan

- The CDR for both components help on September 28th 2017.
- September 15th, 2016: Contract award to Leading for Cassette series manufacturing
- September 20th, 2016: Contract award to Bureau Veritas for Cassette series quality control
- October 10th, 2017: Contract award to AT&M for Spallation Material production
- October 20th, 2017: Contract award to Bureau Veritas for Spallation Material quality control
- December 15th, 2017: Contract award to CEIT for Quality acceptance test for Spallation Material

Target: Internal Structures

Spallation Material

The spallation material production and factory test has been **completed**. The final on site inspection will be performed by BV on August 29th. Acceptance test are schedule for October/November 2018.

Production completed



Target: Internal Structures

Internal Structures

Internal structures are close to be completed. 20 of the cassettes has been delivery to ESS-Bilbao. The production of the remaining 17 will be completed along September.

Production close to completed (20/37)

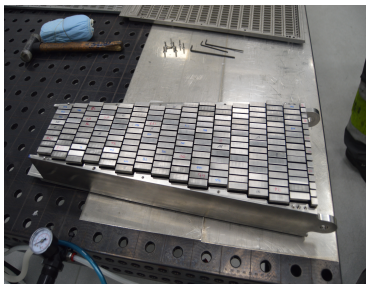
Lifting test



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Assembling test



Target: Internal Structures

Internal Structures

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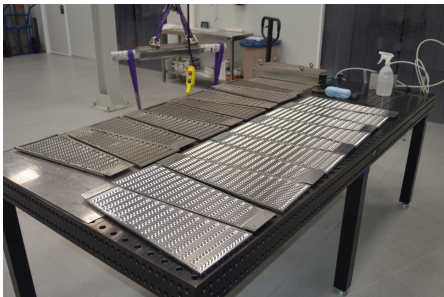
Production close to completed (20/37)



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Bottom Cobers for the final 17 cassettes



Target: Vessel

Target: Vessel

Progress to the plan

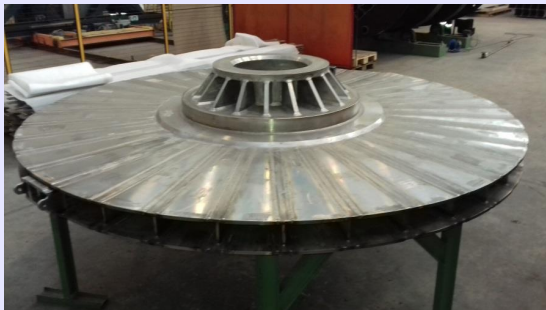
- September 15th, 2016: Contract award to ENWESA for full scale prototype production
- June 15th, 2018: Contract award to Nortemecanica for Cassette insertion prototype production
- June 15th, 2018: Contract award to Mecanica Marina for Cassette insertion prototype production (only pieces without welding).
- CDR for Target Vessel and Shaft schedule for November 2018.

Target: Full Scale prototype

Full Scale prototype

The full scale prototype allow to develop manufacturing procedures, WPS and ultrasound inspections procedure. However, the TIG welding produce large deformation that do not allow cassette insertion. In order to complete the test additional prototype is needed to demonstrate solutions to minimize welding deformations. The prototype is almost completed, pressure test is schedule for October 2018.

Full scale prototype after completion of welding process. Final machining on going



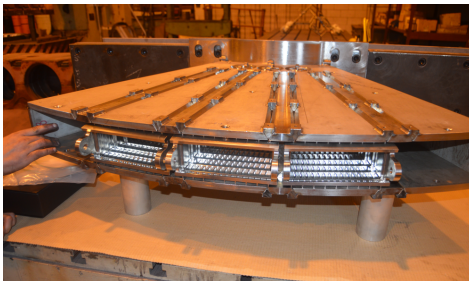
Target: Cassette insertion prototype

Cassette insertion prototype

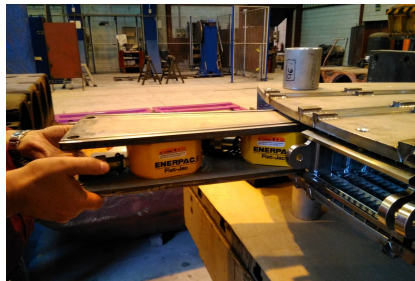
On June 2018 ESS Bilbao award a contract to Nortemecanica to develop a partial welding prototype in order to demonstrate a welding procedure that minimize deformations. Additional stiffeners during welding are included and hydraulic system has been develop to minimize deformation. Welding process will start in September 3rd and it will be completed by the beginning of October.

Cassette insertion prototype

Cassette preliminary insertion



Jack system



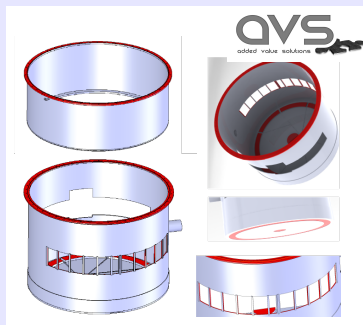
Monolith Vessel

Monolith Vessel

Lower and medium Vessel

- CDR completed on June 2017.
- Contract award on July 2018 to AVS-Cadinox for final manufacturing.
- Manufacturer review is on going. However, mayor modifications will be needed to adapt the manufacturing process to supplier skills.

AVS manufacturing modifications proposal



- Machining after complete the welding process
- Increase the thickness to allow final machining
- Stiffeners in the PBWPB window.
- Flanged union between both sections f the LMW

Monolith Vessel

Connection Ring

- Connection positions for penetrations fixed (Interface Control document) on May 2018.
- Contract award on July 2018 to Empresarios Agrupados for Design work until the CDR.
- CDR Schedule on November 2018.

Head of the Vessel

- Clarification of belows for shaft seals is still on going.
- Design work will restart in October 2018.

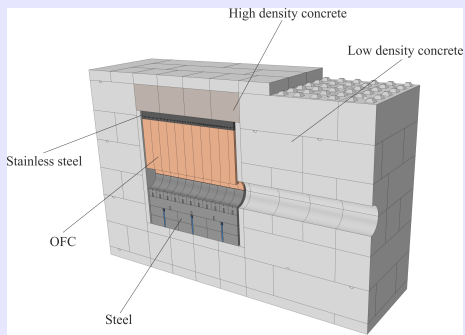
Tunning Beam Dump

Tunning Beam Dump

Tunning Beam Dump Shielding

- CDR completed on June 2018.
- Call for Tender for Steel shielding and T-Copper block on going (Published on July 2018).
- Contracts will be awarded on October 2018.

TBD shielding CDR

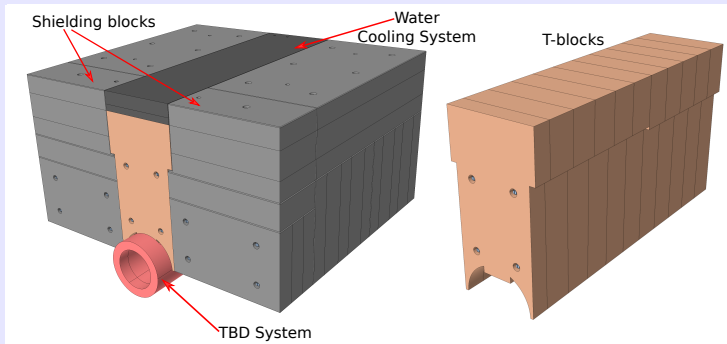


Tunning Beam Dump

Tunning Beam Dump system

- CDR held on Answer to the CDR panel on preparation (almost completed)
- Call for Tender for raw material and manufacturing on going (Published on July 2018).
- Contracts will be awarded on November 2018.

TBD system CDR



Proton Beam Window

Proton Beam Window

Proton Beam Window

- First window prototype completed (Pressurized up to 10.6 bar)
- 3 Additional windows on manufacturing to test the process. Scheduled by the end of September 2018.

TBD system CDR

Window prototype

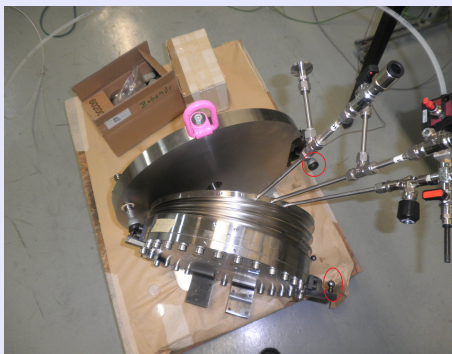
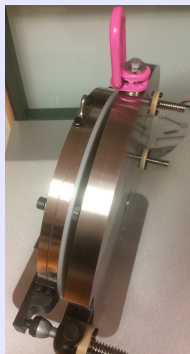


Proton Beam Window

Proton Beam Window seal

- Full scale prototype completed (AWGE). Failure of auxiliary equipment delay the complete test.
- Seal membranes tested successfully.

TBD system CDR



Proton Beam Window

Proton Beam Window schedule

- Manufacturing second test will be completed in October (including pressure test and inspections)
- Seal test will be completed in November (full scale test).
- CDR schedule by the end of 2018.

Conclusions

Conclusions

On going works

- Tuning Beam Dump manufacturing call for tenders on going
- Monolith vessel manufacturing awarded to AVS+Cadinox
- PBEW prototypes will be completed in the next months
- Spallation Material production completed
- Internal Structures (Cassettes) Completed
- Target Vessel prototypes will be completed in tehe next months.