



ESS
bilbao



**EUROPEAN
SPALLATION
SOURCE**

Target project status [TIK 2.1]

Consorcio ESS-BILBAO & IFN-UPM & European Spallation Source ERIC

F. Sordo, on behalf of ESS-Bilbao team

March 14, 2018

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Target: Spallation material and cassettes

Target: Spallation material

Spallation Material

The Spallation material produced by AT&M was delivered to ESS-Bilbao in October 2018 (2 months delayed produced by border officers). The Quality acceptance process has been completed by CEIT with excellent results.

CEIT quality acceptance test



Target: Spallation material

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CEIT quality acceptance test

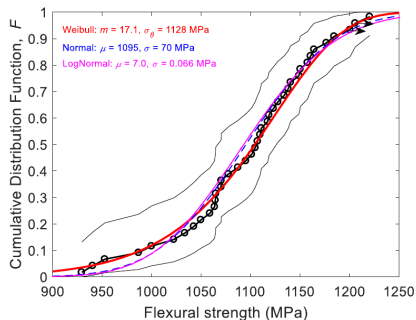


Target: Spallation material

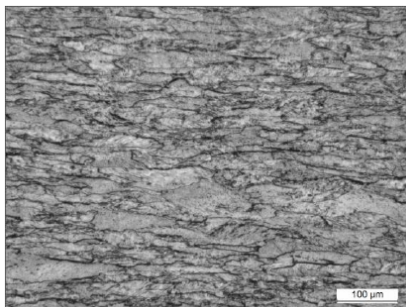
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CEIT quality acceptance test



Optical micrographs from coupon 218325-7005



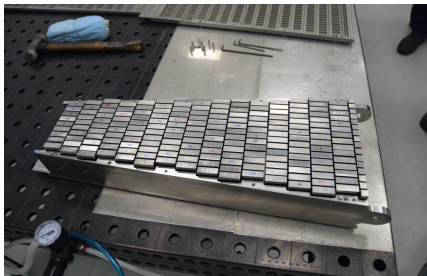
Target: Internal structures-Cassettes

Internal structures

The 37 cassettes manufactured by LEADING S.L. has been deliver and accepted process has been completed. The manufacturing of the hollow bricks is will be completed in the next month.

Leading manufacturing process

Cassette series



Inspection plan completed

LEADING S.L. - PLAN DE SEGUIMIENTO DE FABRICACIÓN / MANUFACTURING FOLLOW-UP PLAN

PROYECTO: DESCRIPCIÓN:

CLIENTE: DISEÑO:

FECHA: DISTRIBUCIÓN:

INFORMACIÓN TÉCNICA:

ESTADIOS FABRICACIONES / Stage of Manufacturing

ITEM	01	02	03
01	01	02	03
02	01	02	03
03	01	02	03
04	01	02	03

REVISIÓN: CALIFICACIÓN:

FECHA:

ISSUE:

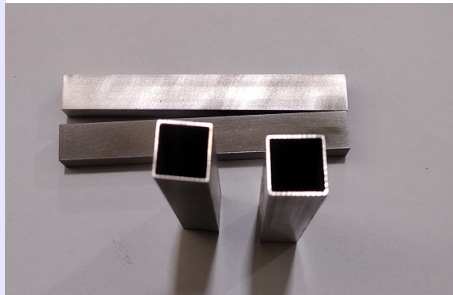
Target: Internal structures-Cassettes

Internal structures

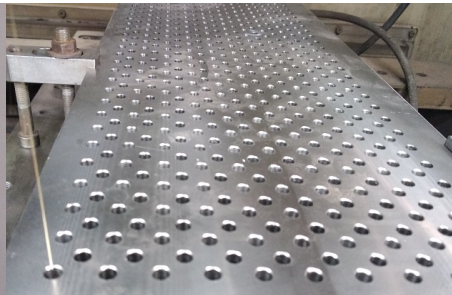
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Leading manufacturing process

Bricks 0.3 mm thickness



Electrocutting for dummy bricks



Target: Target Vessel

Target: Target Vessel

Prototype 3: Cassette insertion 2

The last prototype shows welding deformation reduction of a factor of ~ 20 compared with previous configurations and hence, the assembling is feasible.

Cassette assembly



Target: Target Vessel

NDE inspections

The analysis performed with tow velocity films (D4-D5) films was not successful. However, the analysis performed with the combination D4-D7 allows the characterization of the welding and the thermal accepted area with good quality. D7 films are not accepted on RCC-MRx so, it have to be approved by ESS/NoBo.

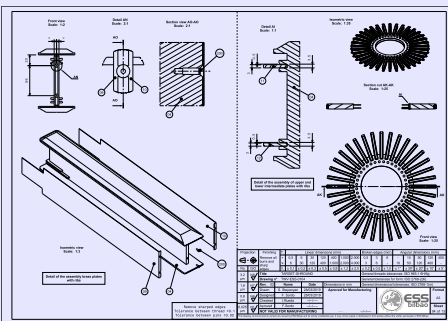
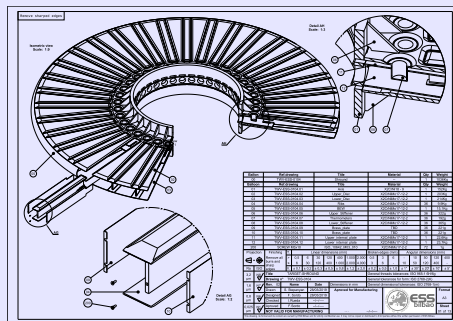
Radiographic inspection reports

Target: Target Vessel

Final updated of the prototype 3 manufacturing path

The manufacturing path has been updated according to prototype conclusions. The calibrated plates solution allow to complete the individual adaptation of the cassettes according to his final welding deformation to ensure the final insertion.

Cassette assembly



Target: Target Vessel

Main remarks

- The prototype 3 has been completed with minor incidences and the cassette insertion is feasible with minor operations on the cassette.
- NDE are feasible with a combination of D4 and D7 films.
- If the “calibrated plates proposal” is approved by ESS we are ready to publish the call for tender for vessel manufacturing.

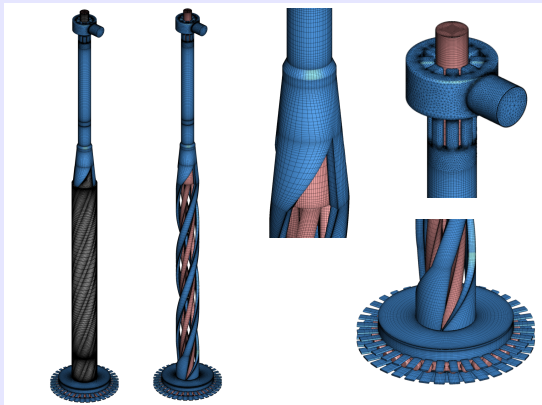
Target: Shaft

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CFD model

After several months of work, the complete CFD target model is completed. The convergence issues has been fixed, the mesh quality has been improved and the miss balanced flow solved.

Shaft mesh and CFD analysis for nominal conditions

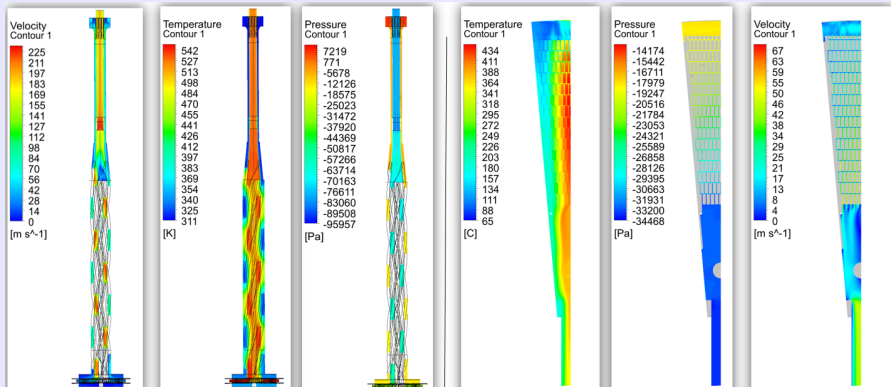


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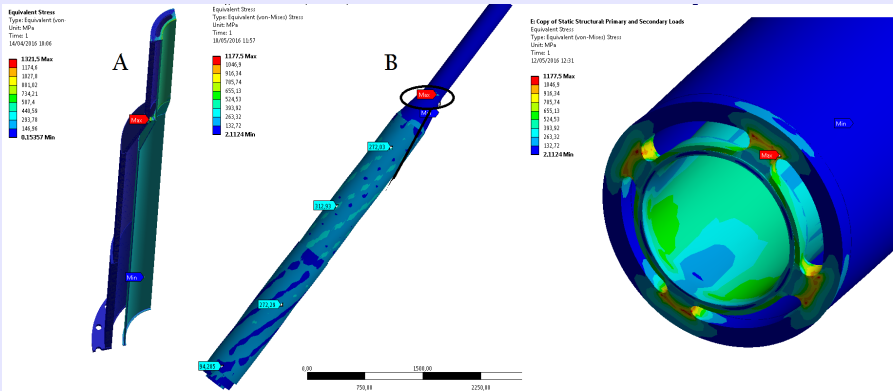


Target: Shaft

Mechanical analysis

Shaft Design report is under ESS review. The analysis is completed and the proposed design withstand all the design loads following $RCC - MR_x$ criteria.

Secondary loads for nominal conditions



Target: Shaft

Main remarks

- The design has been completed according to *RCC – MR_x N3R_x*
- Contract has been awarded to Leading for the internal structure production
- Shaft Call for tender is on going. Contract will be awarded in the 1.5 months.

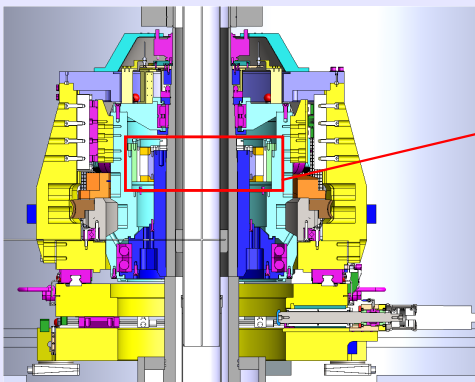
Target : Drive Unit

Target: Drive unit

Drive Unit: Movement System

The design and manufacturing contract was awarded to AVS at the end 2017. The design work has been completed and CDR was held on April 24, 2018. Final quality documentation (FAT test, painting procedure etc.) is on going.

Main components for movement system



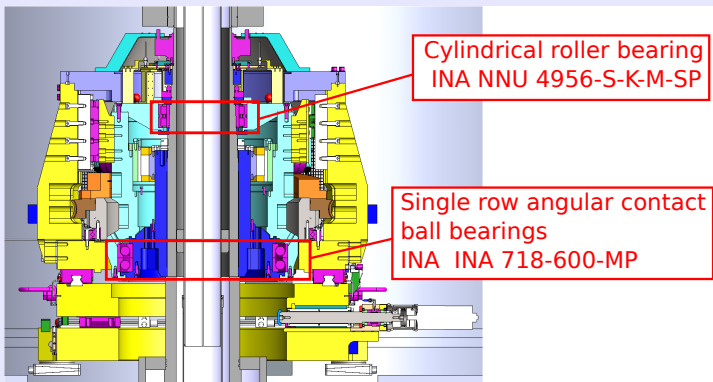
Torque motor
BOSCH MST530C

Target: Drive unit

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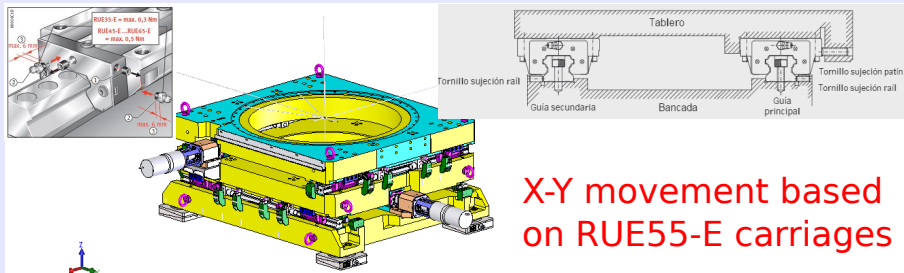


Target: Drive unit

Drive Unit: Positioning system

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Main components for positioning system

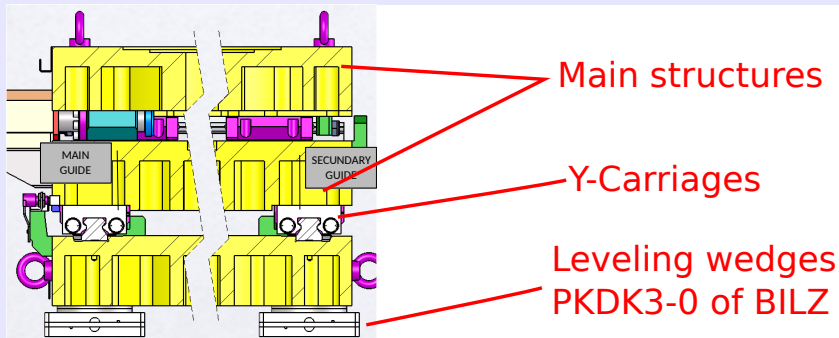


Target: Drive unit

Drive Unit: Positioning system

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Main components for positioning system



Target: Drive unit

Main remarks

- The design proposed in the CDR has been completed including quality documentation, electronics and acceptance test.
- The design has been completed according to $RCC - MR_x N3R_x$ considering the drive unit as a support of a pressurized vessel
- The quality documentation is almost completed.
- The raw material will be ordered in the coming weeks.
- Commercial components will be ordered after the formal approval of the CDR (May 2018).

Target: Conclusions

Target: Conclusions

Main remarks

- **Spallation material and internal structures completed**
- Target Shaft tender on going. Contract will be awarded in the coming months.
- Target Vessel prototyping activities completed. Call for Tender will be published in the coming months.
- Drive Unit CDR will be completed in the coming month. Raw material procurement on going.