



ESS
bilbao



**EUROPEAN
SPALLATION
SOURCE**

Introduction of the ESS Target

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

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Introduction to ESS-Bilbao in kind contribution

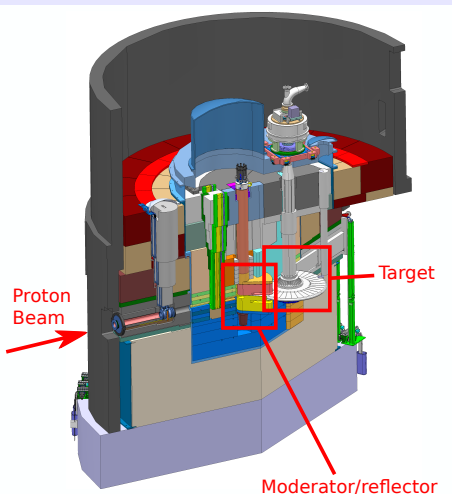
ESS-Bilbao in kind contribution (Target Station)

Role and functions

- The Spanish Government has taken the decision to make ESS-BILBAO the only contractor from Spain to ESS project.
- Staff of 65 scientists & engineers and the possibility to hire extra staff.
- ESS-BILBAO has been nominated as Spanish representing entity for ESS operational phase.
- ESS-BILBAO has already received the money for the following years activities (> 20 M€) and additional grants will be provided in due time.
- ESS-BILBAO is a private entity, so we have a large flexibility to employ and subcontract.
- On November 2014, ESS-Bilbao was chosen as ESS partner for Target Wheel, shaft and drive unit.
- On October 2015, and International Panel Chair by Matt Fletcher evaluate the Target Base Line with positive feedback.
- On September 2016, Critical design review for the Spallation Material and the Cassettes.

ESS-Bilbao in kind contribution (Target Station)

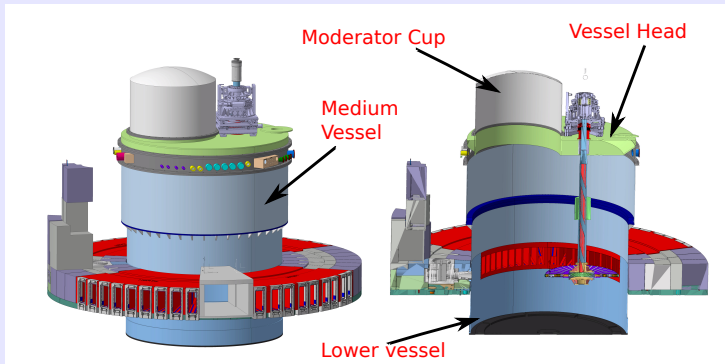
European Spallation Source Target Station



- 5 MW spallation neutron source
- 12 m x 6 m in diameter
- ~ 2500 t. of steel shielding
- 40 neutron ports
- Total budget: 180 M€
- In kind: ~ 100 M€

ESS-Bilbao in kind contribution (Target Station)

ESS-Bilbao Workpackages on ESS Target area



Neutron ports

On September 2016, Neutron ports are still under discussion.

ESS-Bilbao in kind contribution (Target Station)

ESS-Bilbao Workpackages on ESS Target area

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
Beam Instrumentation plug	—	Oct-2018
Neutron Beam Windows	—	Oct-2018
TOTAL	17.9 M€	
Target instrumentation plug	—	Oct-2018
Neutron Ports	—	Jan-2018
TOTAL	21-26 M€	

The ESS Target

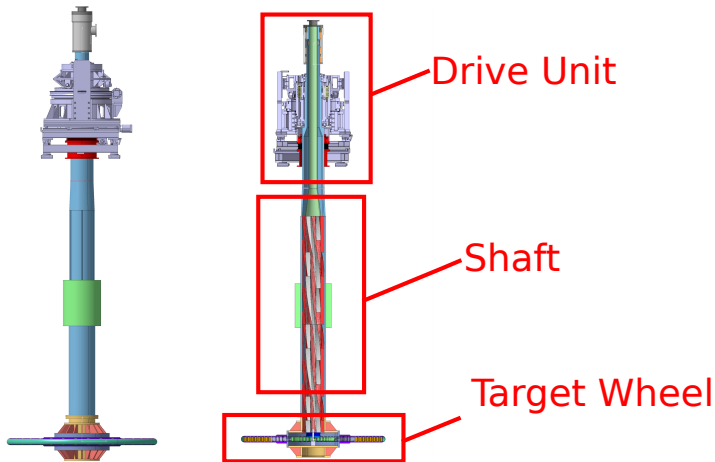
The ESS Target

Main Target parameters

- Spallation Material: Hot Rolled W
- Internal Structures and shielding: SS-316L
- Target Vessel and shaft: SS-316L
- Beam Power: 5 MW
- Max Proton Energy: 2 GeV
- Life Time: 5 years
- Coolant: helium
- Helium Pressure: 10 bar
- Helium flow mas: 3 kgs^{-1}
- RCC-MRx Class 2 Component
- Life time 5 years

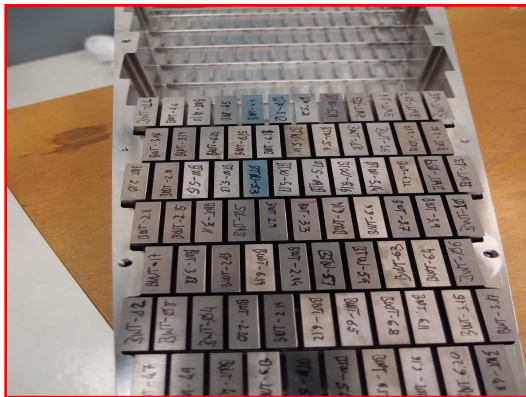
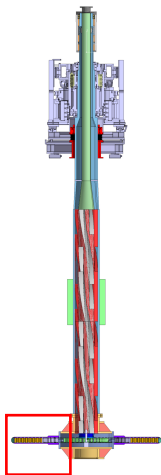
The ESS Target

Main components: Target wheel, shaft and Drive Unit



The ESS Target

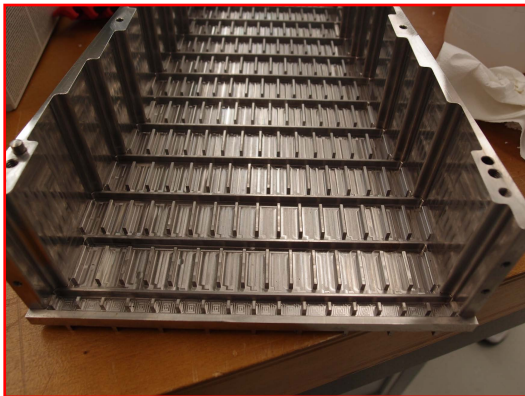
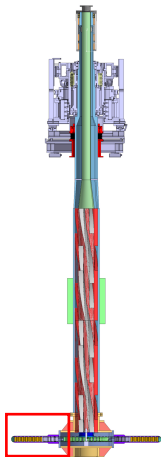
September 28th, Critical design review for Target Spallation Material



Spallation Material

The ESS Target

September 27th, Critical design review for Target Internal structures



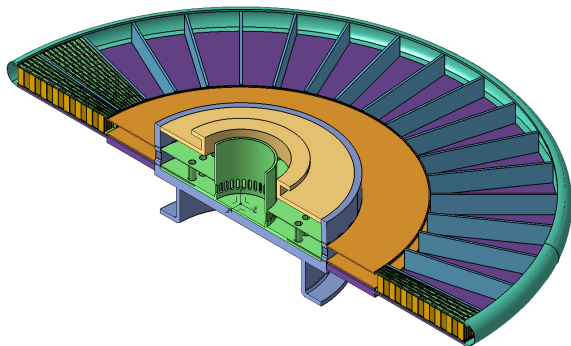
Internal structures
(SS-316L)

The ESS Target

The Target Wheel

The Target Wheel includes the spallation material, internal structures and target vessel. Target Vessel is not in the scope of this review. However boundary conditions between both systems are close connected.

Target Vessel configuration

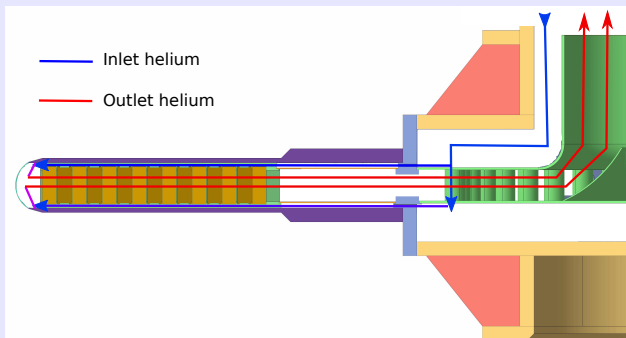


The ESS Target

The Target Wheel

The Target Wheel is the structure that configures the structure that withstand the spallation material and configures the helium flow path. It is not in the scope of this review. However boundary conditions between both systems are close connected.

Helium flow path



Conclusions

Conclusions

Summary and remarks

- ESS-Bilbao has an in kind contribution to ESS Target station of 17.6 M€
- Several packages included in the Target interfaces (PBIP or Monolith Vessel) are included on ESS-B in kind contribution
- CDR for the Spallation Material and the cassettes is partial CDR of the Target Wheel
- Target Vessel and helium flow path outside of the spallation material is not included in the scope of the review