



**ESS**  
**Bilbao**



**EUROPEAN  
SPALLATION  
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## **08. Manufacturing process of the PB Connecting Pipe**

**ESS-Bilbao**

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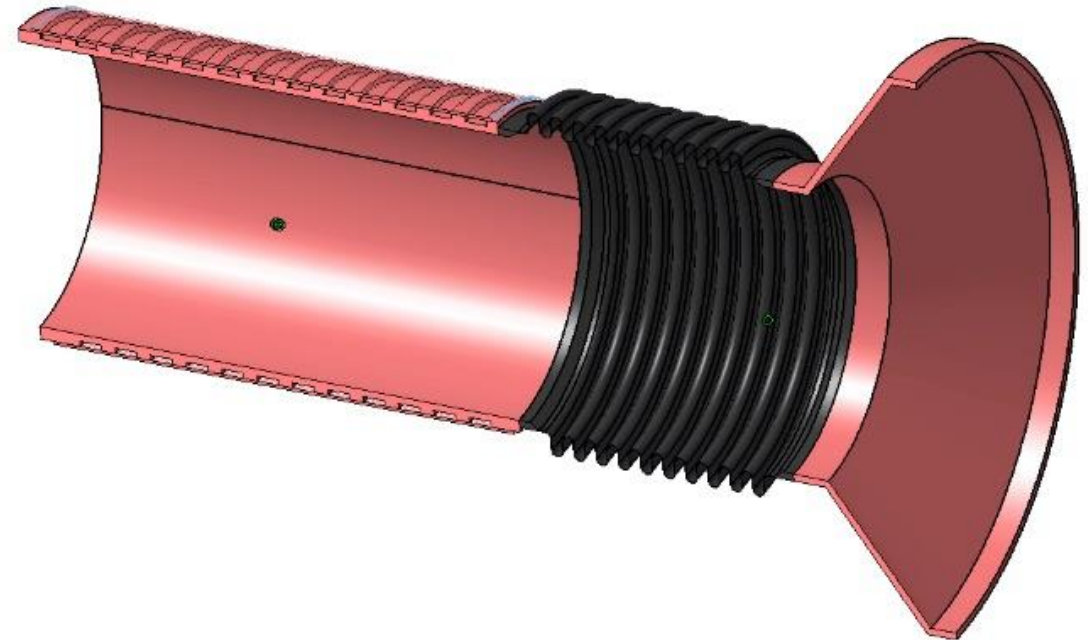
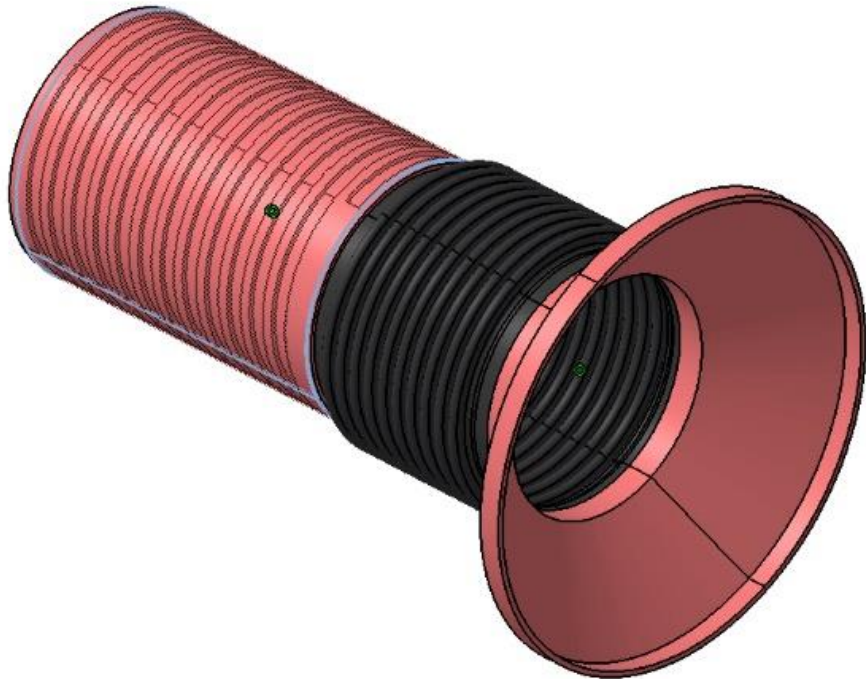
- 1 Manufacturing process and ITP

# Manufacturing process and ITP

# Manufacturing process of the PB Connecting Pipe

## Assembly

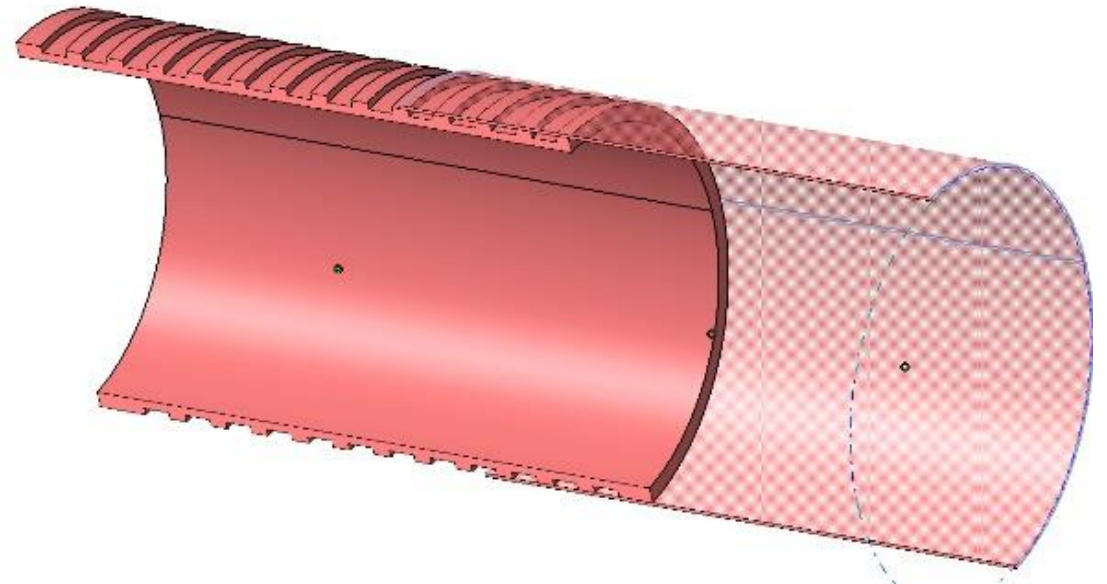
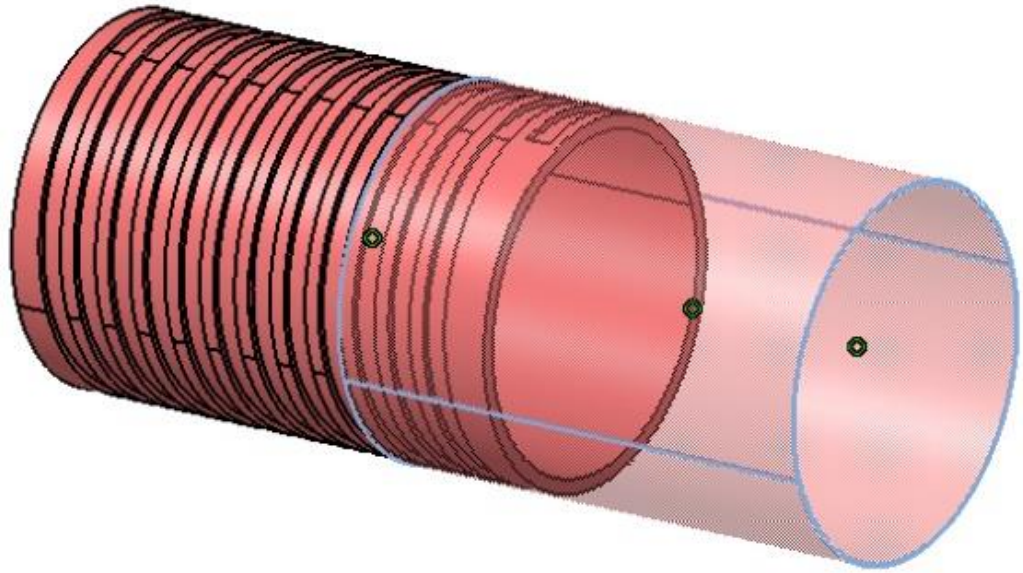
- The CP Will be manufactured in 3 separated parts.
  - Cooled Pipe: body and cover.
  - Bellow
  - Transition pipe.



# Manufacturing process of the PB Connecting Pipe

## Cooled pipe

- Body:
  - Raw material be a 230 mm diameter cylinder. Lathering the recess to obtain final outer and inner diameters.
  - Helical channel Will be machined on the Surface.
- Cover:
  - Starting from a 235 mm diameter. Lather to the final dimensions.
- Assembly:
  - Heating the cover and cooling the body, it will be possible to insert the body inside the cover with some tolerance. After reaching ambient temperature, a fit between them will be achieved.





# Manufacturing process of the PB Connecting Pipe

## Prototype of the CP

- Scaled prototype. 1:2.
- Proven the capability to withstand 5 bar pressure.
- Deformations of the cover (jacket) around the pipe are less than 30 microns. There is no bypass in the design.
- Coolant flows easily through the helical channels, cooling both the pipe and the cover.



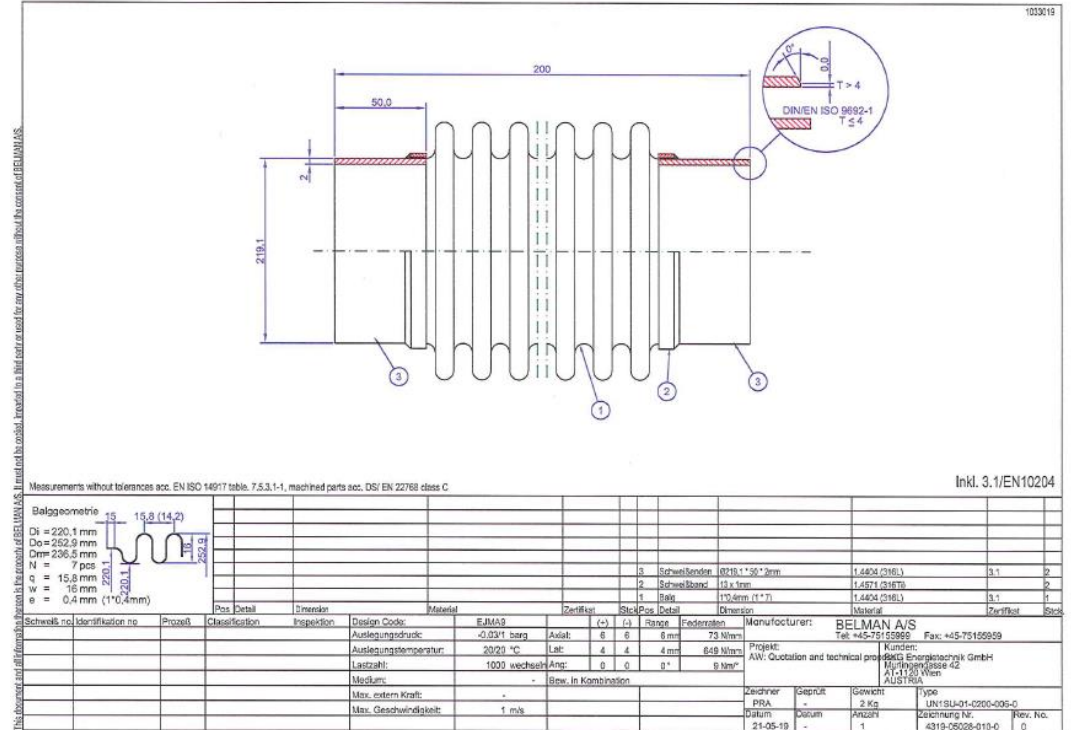
# Manufacturing process of the PB Connecting Pipe

## Bellow

- Hydorformed bellow, no welds between convolutions.
- Already contacted several providers: can manufacture it according to our dimensions.



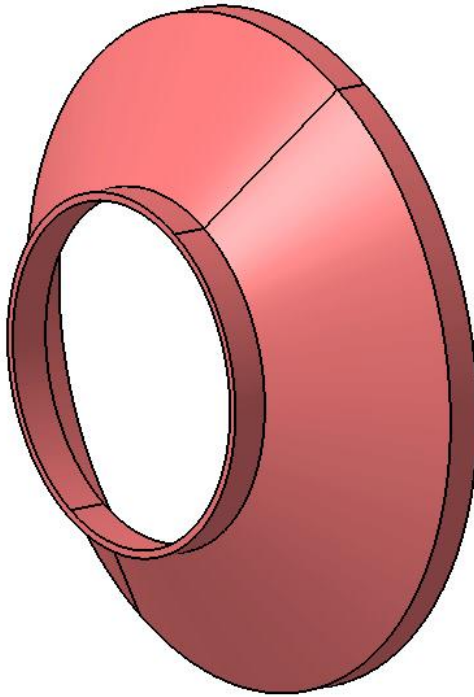
LATERAL



# Manufacturing process of the PB Connecting Pipe

## Transition Pipe

- Internal and external lathering.





# Manufacturing process of the PB Connecting Pipe

## Inspections

- Welds:
  - 5 welds: butt welds between tubes. Fillet welds to weld the cover to the body.
  - $\pm 15\text{mm}$  for volumetric inspections in all of them.
- Tests:
  - Can be tested (pressure and vacuum tests) separately from the PB&Vessel.

