



HSE  
Occupational Health & Safety  
and Environmental Protection unit

# Memorandum of Safety Checks for XCET vessels

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# Project liable to have Major Safety Implications

Aluminium casting pressure vessels:

- No material certificates
- No history of operation
- No design file



Conclusion: assessment of the vessels, if done by a Notified Body, would be difficult and time consuming. HSE will support the project in order to maintain acceptable level of safety.

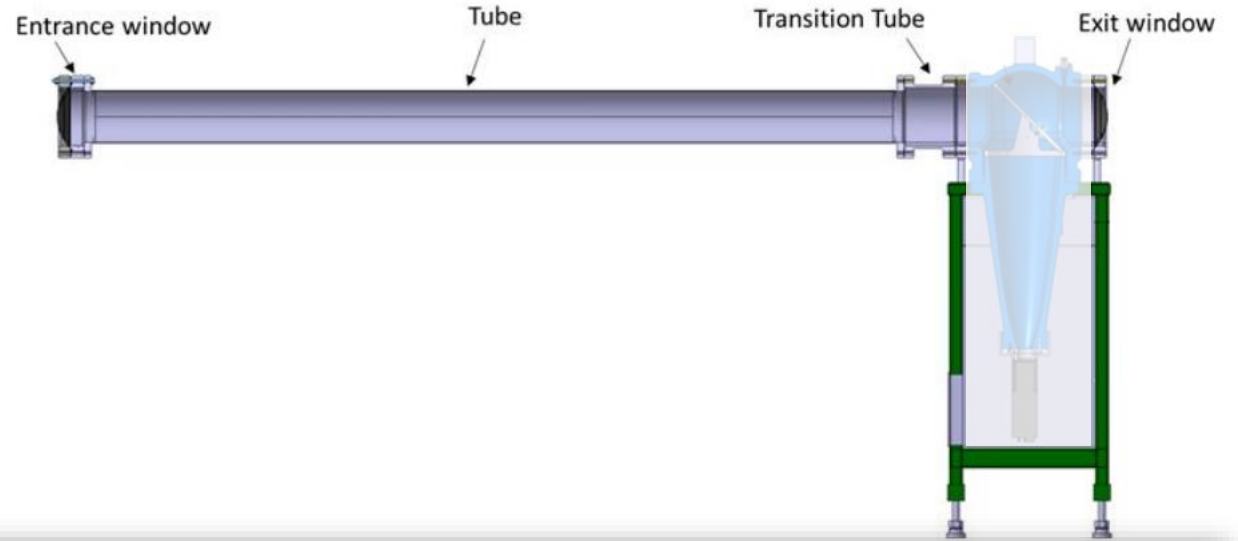
# Memorandum of Safety checks

- Safety documents
- Specific Safety documents
- Safety inspections and acceptance test

Requirements listed in Memorandum of Safety checks is a base for granting a Safety clearance.

# Safety documents

- Standard documents required for all the components produced/designed within the last few years with full traceability
- Procedure for pressure testing



- Contents of the safety file (including operational and commissioning procedures)
- Mechanical Safety:
  - Engineering design file for the new elements of the pressure vessels
  - Non-destructive examination reports of the welds on the pressure vessels to an extent given in EN 13480-5 Table 8.2.1 at a minimum. The project commits to perform radiographic testing of 50% of the welds.
  - Conformity declaration for the standard components
  - Pressure test procedure, including exclusion zone
  - Material certificates

# Specific Safety checks

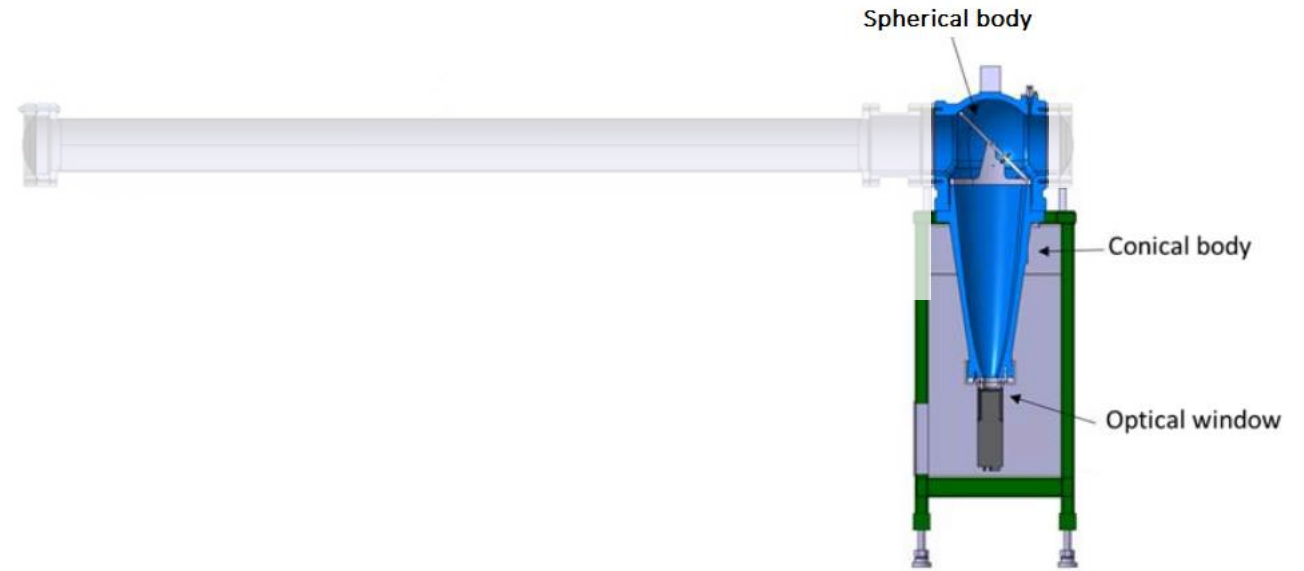
- Documents provided last year for the aluminium windows
- Documents provided last year for the optical windows
- **Latest change: Mylar windows – to be discussed**



- Window's assembly (window + flange + sealing spacer) design report
- Experimental verification of the window's assembly design
- Optical SiO<sub>2</sub> window design report
- Experimental verification of the optical SiO<sub>2</sub> window design

# Safety inspections and acceptance tests

- Tomography of the four bodies proved that assessing the vessels state by NDT methods is not feasible
- Pneumatic pressure test of the aluminium vessels + optical window in the bunker
- Pressure test of the assembled vessels *in situ*



## Mechanical Safety checks:

- ✓ Tomography inspection report for the two spherical and the two conical bodies
- ✓ Proof test of the 4 spherical and 4 conical bodies assembled with optical windows
- ✓ Proof test of the 4 assembled pressure vessels
- ✓ Visual inspection of the optical SiO<sub>2</sub> windows (recycled)

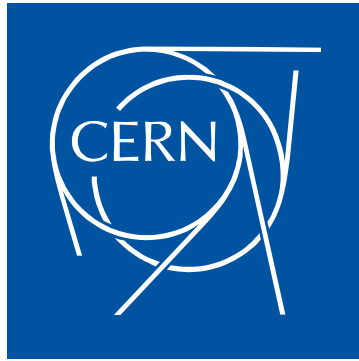
# Safety inspections and acceptance tests

- No access to the zones with 15 bar vessels when pressurised
- Monitoring strength of the vessels at 15 bar by regular pressure testing in the bunker (frequency and overpressure can be discussed)



## Emergency Preparedness checks:

- ✓ Shielding of the aluminium vessels in the experimental zone T09 and T10
- ✓ In-service monitoring schedule for pressure vessels operating at 15 bar in zone T09-10
- ✓ Interlock with access control system



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