

Questions to ask other working groups with respect to civil engineering:

Building(s): dimensions and loads

- Size and dimensions of required areas (experimental area, preparation area, please add drawing or sketch)
- Clear height
- Facility access (large gate required?)
- Load capacity of floor
- Lifting and transport equipment (bridge crane) necessary?
If yes, please specify maximum load capacity and span.

Special mechanical requirements:

- Any special concrete structures for equipment (e.g. base plates, mounting supports)? If yes, please estimate.
- Any requirements on vibration (microvibration) behavior of buildings? If yes, please specify.
- Considering vibrations and beam alignment, should the accelerator, laser and target halls be on the same structure?

Special Equipment and air conditioning:

- Clean rooms for special equipment necessary? If yes, please estimate area, volume and cleaning level.
- Are special laboratories necessary (e.g. radioactive, chemical, biological labs)? Please specify.
- Any special requirements on floor and ceiling finishes?
- Air conditioning:
 - Nominal temperature \pm tolerance
 - Humidity control necessary? If yes, please specify maximum humidity. Humidity range (also minimum humidity) only if **really** necessary.
- Is there any activation of ambient air requiring special ventilation, filtration and dispersion systems when exhausting into environment? If yes, please specify maximum radioactive concentrations and filter types.

Media supply:

- Electricity: Which voltage and power required at which places (\rightarrow sketch) - peak power and average power requirements
- Cooling air (consumption, pressure)
- Compressed air (consumption, pressure)
- Industrial water
- Cooling water (consumption, pressure, max. temperature of return flow, demineralized needed?)
- Other gases necessary? (which gas, pressure, consumption, in case of cryogenic gases also inventory)

- Helium recovery line required?
- Pump exhaust system required?

Radioprotection/Shielding:

- Radioprotection necessary?

If yes, please specify location in sketch and

→ preferred (if known): material(s), dimensions, total weight

Otherwise: type of secondary source(s) (e.g. electrons, ions, X-rays...), intensity, expected energy, maximum energy.

- Special requirements on architecture and materials for construction of heating-cooling agent distribution plant, to avoid activation? If yes, please specify.
- Special requirements on design of building materials used to minimize activation? If yes, please specify.
- Specify source term for radioactive emissions for each proposed experiment and, if appropriate, validated computer codes for simulations for radiation protection calculations.
- Exhaust, if there are toxic components or gases, any radioactive gas emissions.
- Any requirements on controlled access, security systems to forbid access during experiments?
- Electromagnetic shielding requirements, if necessary.

Additional rooms or buildings:

- Please estimate the permanent operating personnel (by topical areas). Control room for remote-controlled equipment necessary? If yes, please estimate area.
- Special locations for temporary storage of activated materials, tools or equipment or radioactive waste necessary? If yes, please estimate area.
- Any requirements on locations in the main building for equipment maintenance? If yes, please specify equipment and estimate area.
- Any auxiliary (technical) locations for facility operation? (besides the maintenance locations) If yes, please specify the locations and estimate area and equipment required.
- Any special building for workshops (laboratories) designed for maintenance and repairs? (which workshops, laboratories). Please estimate for each of them area and equipment required.
- Any stand-alone building for research and administrative personnel? Please estimate the research personnel required in your topical area.