

Paschen testing of PF coils

Version 1.0

Tested coil groups:

1. PF1aU
2. PF1bU, PF2U, PF1aL PF1bL, PF2L
3. PF3U and PF3L
4. PF4U and PF4L

note: Coils will be tested with electrical break attached to the coils terminals

Specification of testing procedure:

- Tests shall be done at room temperature but at least after one thermal cycle of the coil to the operational cryogenic temperatures.
- DC voltage shall be applied.
- The polarity should be such as to have the anode on the ground plane since the glow will appear in the anode environment.
- Pressure shall be swept from vacuum values (10^{-2} Pa) to atmospheric ones. The testing voltage shall be maintained at each pressure decade for at least 1 minute
- Air is preferable.
- The final ground plane should be placed after the tests. The positive pole during the tests could be a metallic mesh placed around the coil that would allow the visualization of flashovers. A grounded vacuum vessel could also do the work with adequate precautions.
- The leakage current shall be continuously monitored (and never higher than the threshold given by the specified resistance of the insulation, which typically is 500 MOhm). The tests should be done twice, before and after the cooling down, and the leakage currents plots are compared.
- Cameras placed inside the chamber shall allow the positioning of the breakdown.
- All problems detected with Paschen tests shall be repaired and the coils retested
- The ramp-up and ramp-down of the voltage to the nominal testing value should be done at a rate of 20 V/s.

Testing voltage: **2 kV**

Vacuum range: **10^{-2} - 10^6 Pa**

Resistance of the insulation: **Riz ~ 500 MΩ**