

1	Connect pumping equipment (group) with leak detector to insulation vacuum	<p>1 or 2 pumping groups? connected to SB or CM or both?</p> <p>Which pumping group? Size of the primary (for slow pumpdown a small primary can suffice).</p> <p>Who (which system, CRG or VSC?) measures the readout of the CM Pennings?</p>
2	Connect (mobile, or fixed turbo) pumping equipment with leak detector to beam vacuum valve	Slow pumpdown (or small primary), clean pumping group for clean room standard. What turbo pump for the tunnel? what gate valve, all metal or Viton sealed? What primary model and pumping speed?
3	Pumpdown/ purge insulation vacuum <i>(this part is out of the responsibility of VSC, for establishing procedure and carrying out. Can VSC do it with our definition and equipment (nitrogen bottle filter)?</i>	Dry nitrogen bottle – equipped with water filter; pump down slowly not to stress MLI – it is sufficient to use the primary pump alone for this, if it is a small one. Leave under nitrogen for 30min before pumping again.
4	Leak detection air to insulation vacuum	<p>Connect leak detector to exhaust of turbopump. Check background and note. Spray helium from top to bottom of cryomodule. Apply procedure EDMS 1318157 and <a href="#">tutorial</a></p> <p><i>We can check here all ports, to ensure no damage was introduced by transport. VSC? who else?</i></p>
5	Force beam vacuum plug-in valves open, while string is under atmospheric pressure of dry nitrogen	<p>Check pressure on the string with the 2 Pennings on the FPC?</p> <p>With nitrogen from a bottle with filtered outlet (Millipore filter, clean room standard), rinse the connecting pipework (<i>and BPM pumping module</i>) repeatedly. Check final pressure and leave at slightly sub-atmospheric pressure? Or check pressure difference using the FPC Pennings? Open plug-in valves.</p>
6	Pumpdown beam vacuum	Slow pumpdown; for this, a slow pumpdown pumping group is required; a small primary is sufficient to ensure slow pumpdown. Do not leave on limit pressure with the group pumping on beam vacuum. How do we ensure this? Which gauge is used in SM18, which one in the tunnel (Penning on VMCCP)?
7	Leak detection air to beam vacuum	Connect leak detector to the exhaust of the turbo-pump. Spray helium to the external connections to vacuum equipment.

8	Purge cryogenic lines (CRG)	Purge repeatedly (how many times are needed?) the cryogenic lines with dry nitrogen gas. Always leave 30min under nitrogen atmosphere between one purge and the next
9	Introduce helium gas in the cryogenic circuits, up to 1.8 barg (to be defined by L.Dassa tomorrow) (CRG)	Introduce dry helium from a bottle (filled at the refrigerator if possible) in the cryogenic circuits (from which port?), up to the pressure specified with safety for the pressure test.
10	Leak detection insulation vacuum to helium	Check helium signal on leak detector on insulation vacuum
11	Leak detection beam vacuum to helium	Check helium signal on leak detector on beam vacuum
12	Helium gas or Argon gas in insulation vacuum?	Normally not, if string was tested before closure of the cryomodule, but this should be verified with the help of VSC and CRG experts. If this leak test is required, do we need to do it with argon – and the RGA?