

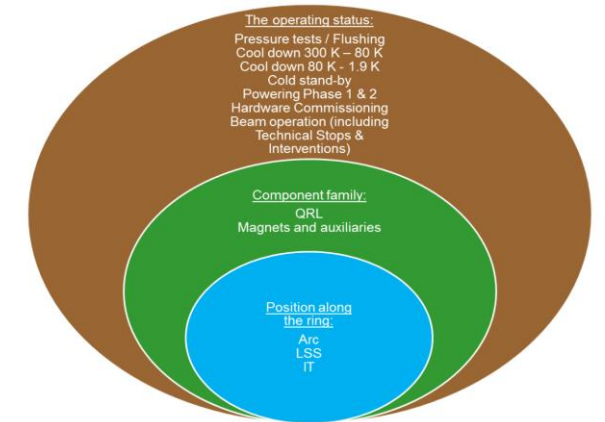
He spill wg recommendations (Aut'17), EDMS#1410247

- Formal recommendations following clear risk assessment (various He flow categories), safety impacts (operation modes) or configurations (zones) with definition of an access matrix (modes-components-position) and work conditions

Table 1		Pressure Test	Flushing or use at warm conditions (300 K)
Status of equipment	Equipment	QRL	QRL
	Access conditions in	Arc	LSS
	IT*		
Table 2	Equipment	ARC / LSS / IT	ARC / LSS / IT
	Access conditions in	Arc	LSS
	IT*		
Leak rate in case of incident [kg/s]	1	0.052	
Access and Work Conditions	Access forbidden	People accessing the LHC tunnel have completed SRM (Self-Rescue Mams) cours; people working on cryogenic equipment must work according to approved procedures which take into account restricted access zone	
Comments	Pressure Tests of DFBs (Cryo-Feed Boxes) are carried out based on ad-hoc procedure: <ul style="list-style-type: none"> DFBs pressurised locally by He-bottle Non-entry areas to be defined and fenced locally. 	Use of circuits under conditions fully covered by Pressure Tests	
*IT: in this document, the IT is considered to be the areas from Q1, included, to the end of the tunnel towards the IP.			

Table 1		Status of equipment: Warm-up 80 / 100 K - 300 K	
Access conditions in	Equipment	Arc	LSS
	IT*		
Table 2	Equipment	Arc / LSS / IT	
	Access conditions in	Arc	LSS
	IT*		
Leak rate in case of incident [kg/s]	1		
Normal Access and Work Conditions	Access condition to LSS and Arc is restricted, to IT closed		
Exceptional Access Conditions to Arc and LSS	Indispensable interventions in the interest of machine- and personal safety in LSS and Arc during this phase can be exceptionally authorised. These interventions require prior risk assessment by He-spill safety officer and CRG group and must be authorised by the complex manager (Procedure EDMS 1406764). As an additional safety measure, the flow of cryogenics will be reduced and the temperature transient temporarily put to halt.		
Cool-down/ warm-up of standalone equipment	A special risk-assessment, including the definition of an exclusion zone must be performed. These interventions require prior risk assessment by He-spill safety officer and CRG group and must be authorised by the complex manager (Procedure EDMS 1406764).		
Comment	During the warm-up the risk probability of an unexpected mechanical rupture is reduced w.r.t. the cool-down since the failure of any mobile point could leave to a buckling phenomenon which is less critical than any rupture induced by material contractions.		
*IT: in this document, the IT is considered to be the areas from Q1, included, to the end of the tunnel towards the IP.			

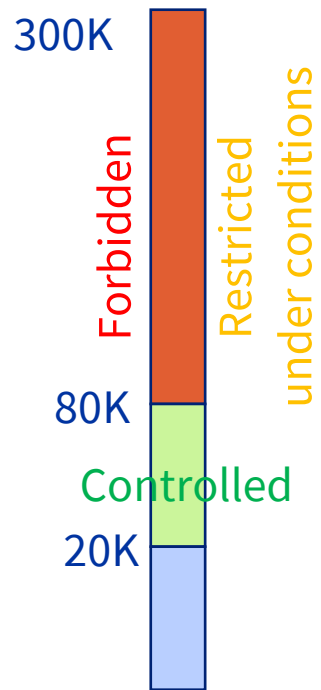
Forbidden
Restricted
Controlled



- For "below 80K conditions", exceptional derogations possible with procedure and mitigation measures

Rmk: Restricted access during warm-up defined in 2.6.8, even if not recalled in access matrix (reduced risk w.r.t cool-down, due to less damage wth buckling compared to rupture)

Activities in sensitive areas (Aut'20), EDMS#1406764



=> Sensitive areas
=> Specific areas

- **Below 20K: sensitive areas (fragile cryogenic instrumentation)**
 - work frame for regular activities (TS, YETS)
 - exceptions on case-by-case

=> Complete list & DCUM in annex (QRL, DFB's, SAM's, RF)
- **Specific areas and exceptions for well justified cases:**
 - Inner Triplet Areas (short Vs long access)
 - RF at P4 (specific case at 4.5K)
 - Forward experimental areas in UJ12-UJ18
 - Side tunnels like TD62-TD68, injection tunnels TI2-TI8

=> No additional authorisation for last two lines