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## 1. Scope

- I. In this document the operating parameter for the central cryogenic system are given. The central cryogenic system covers all components related to the systems described in the Common Specification [1].
- II. It does not cover the parameter of further small cryoplants which may be operated by other groups.

## 2. Definitions

- I. The subdividing of the components and the cryogenic system in presented in the Common Specification [1].

## 3. Operating Parameter

### 3.1. Helium conditions

The operating parameters at the inlet of the feed boxes are given in the following table, where the pressure is given with a tolerance of .05 bar for the suction lines and .1 bar for the supply lines. The tolerance for the temperatures is .2 K for the 4K level and 1 K for the intermediate level.

**Table 1: Operating parameter**

			label	
			drawings	Nomenclature
4K level				
Normal operation	Supply	4.6 K, 3 bar	A	1
	Suction	1.1 bar, max. 5K allowed	B	2
Cool down distribution system	Supply	18 bar	A	1
	Suction	4 bar	B	2
Intermediate level				
Supply		50K, 18 bar	C	3
Return		80K, 17 bar	D	4

Multipurpose line	1.1 (- 4) bar, pure helium	E	8
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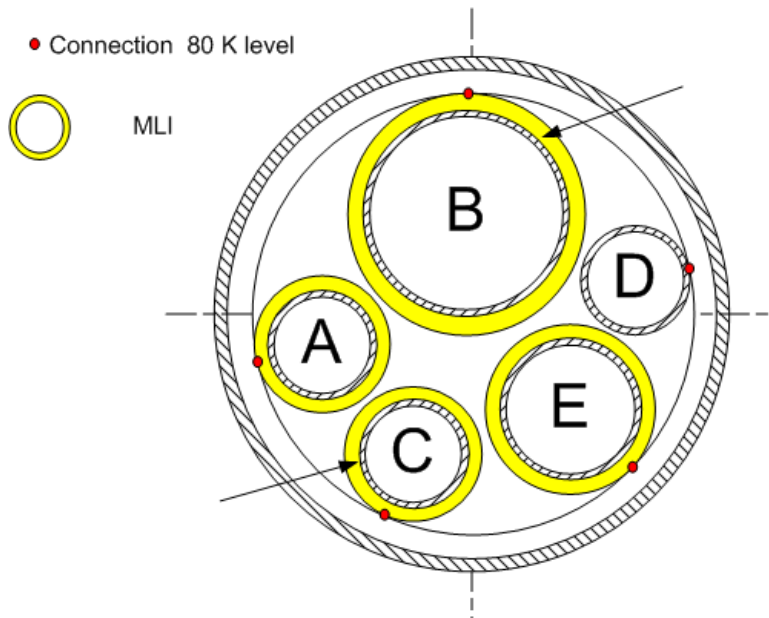


Figure 1: Cross section of a standard transfer line with labels from Table 1.

If a return line for warm helium, i.e. from current leads is requested, a suction pressure at the interface to the machine (most likely next to the feed box) of 1.1 bar will be provided.

### 3.2. Mass flow rates

The mass flow rates for the individual users are summarized within Table 2. These values are given for the design of the cryogenic piping not for the installation of refrigeration power or machine design.

**Table 2: design mass flow rates for the different users in FAIR.**

User	mass flow rate [g/s]			Cool down margin [%]
	4K circuit		80K circuit	
	Minimal	Maximal		
SIS100 total	140	1000	70	0
SIS300	100	230	55	0
HEBT300	21	30	30	10
CBM	10			50
SuperFRS	70		60	50
R3B	3		3	50
Low energy branch	4		4	50

#### 4. References

- [1] Common Specification Cryogenic, F-CS-K-03e Cryogenic v1.0