# Useful information to prepare your beam time on the DEIMOS beamline (SOLEIL)

02/06/2021

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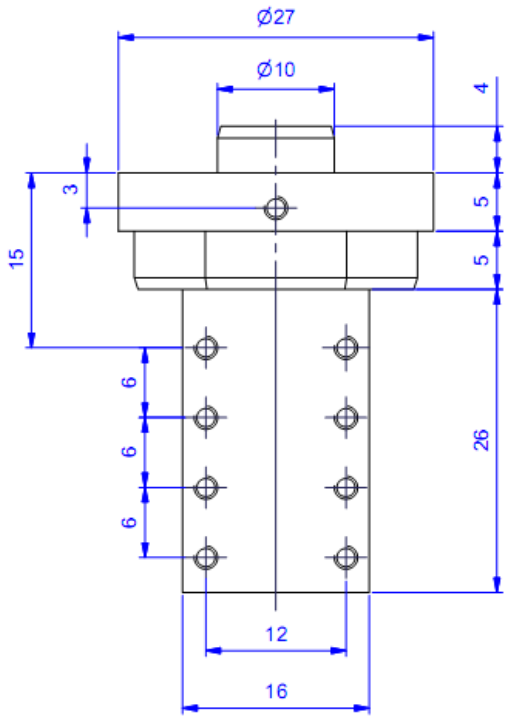
## I. Sample holders used

All the sample holders used for the cryomagnet are in copper. The most commonly used are the "Long" and the one made to host an Omicron plate (needed for the transfer to the *in situ* preparation chamber (STM, LEED, AES, …).

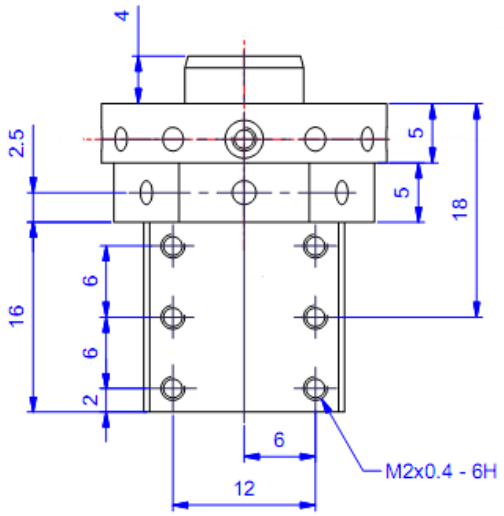
### 1. Sample holder size

All the sample holders are in copper. The most commonly used are the "Long" and the one made to host an Omicron plate (needed for the transfer to the *in situ* preparation chamber (STM, LEED, AES, …) both used on the CryoMagnet.

- *"Long"* (useful surface ~26×12 mm²) pour le **CroMag** (numéros type L##) :

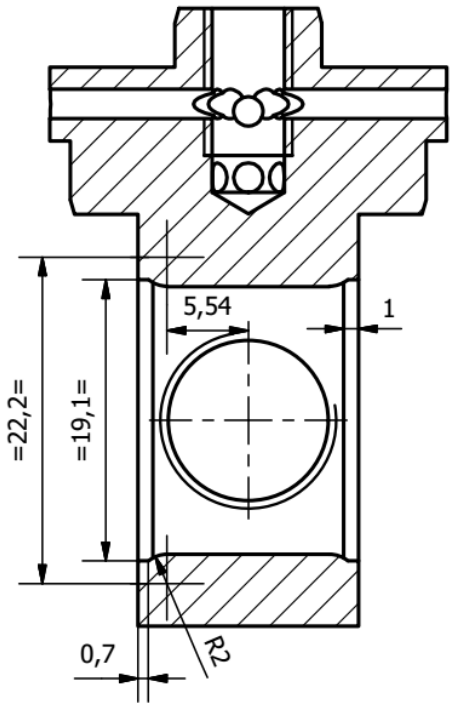


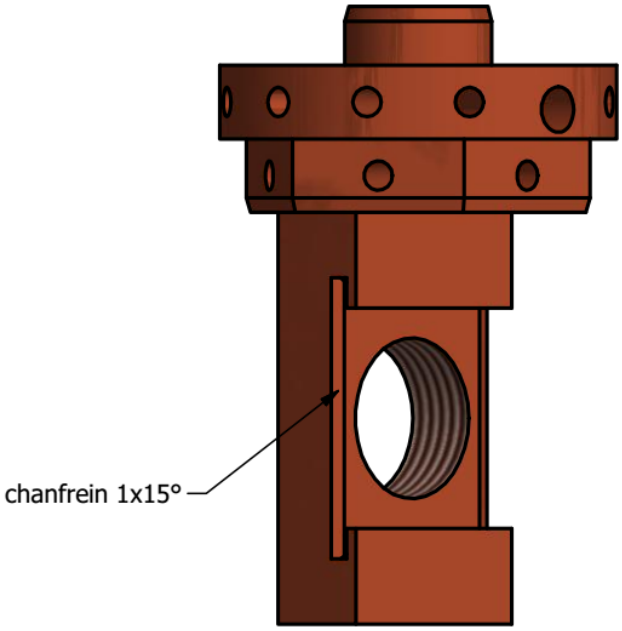

- *"Short"* (useful surface ~16×12 mm²) pour le **CroMag** (numéros type C##):

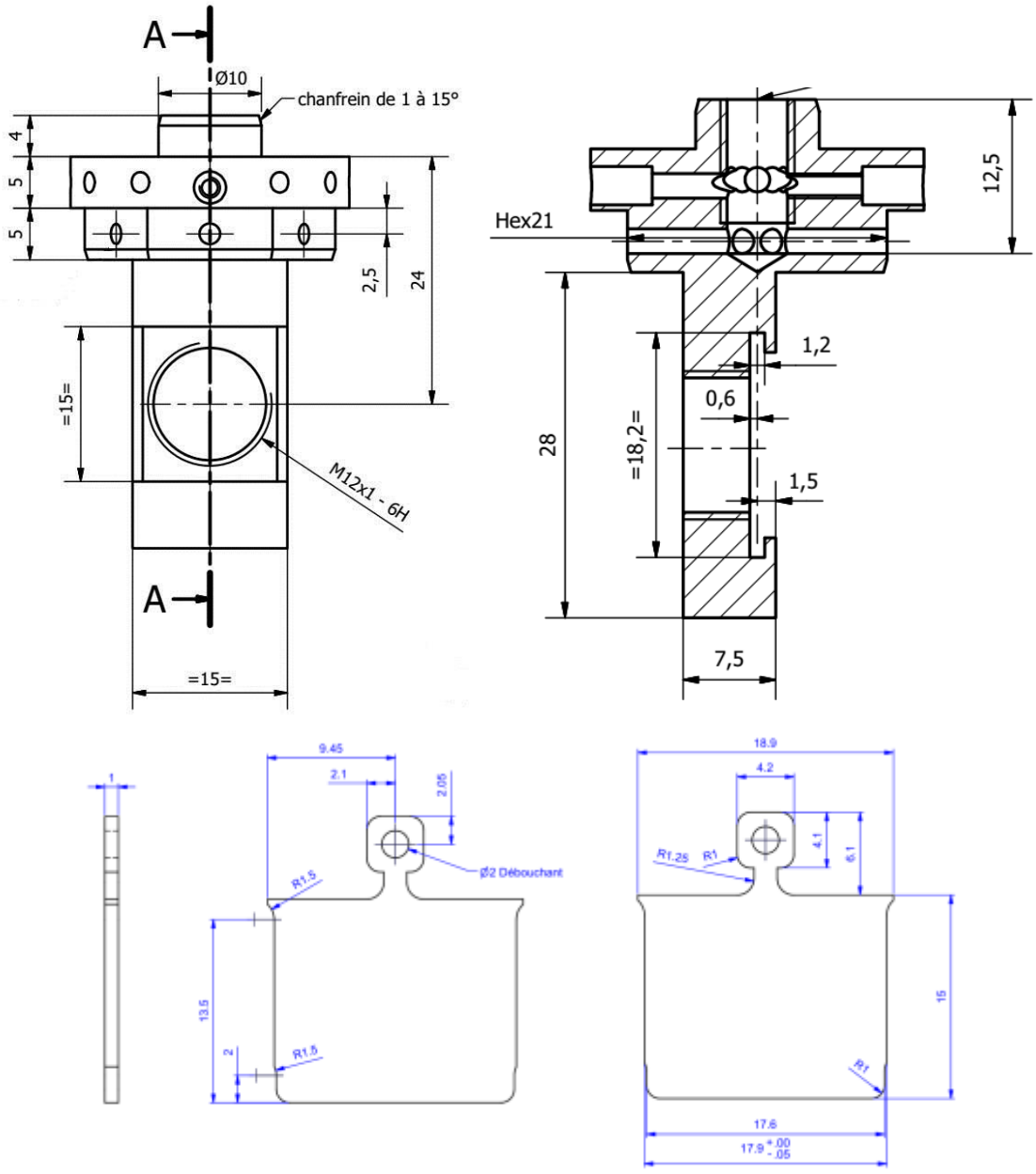



- *For Omicron plate* (useful surface ~12×12 mm²) pour le **CroMag** (numéros type P##):

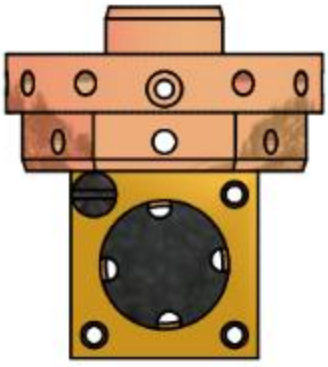
*Old design*


5,54
1
=22,2=
=19,1=
0,7
R2

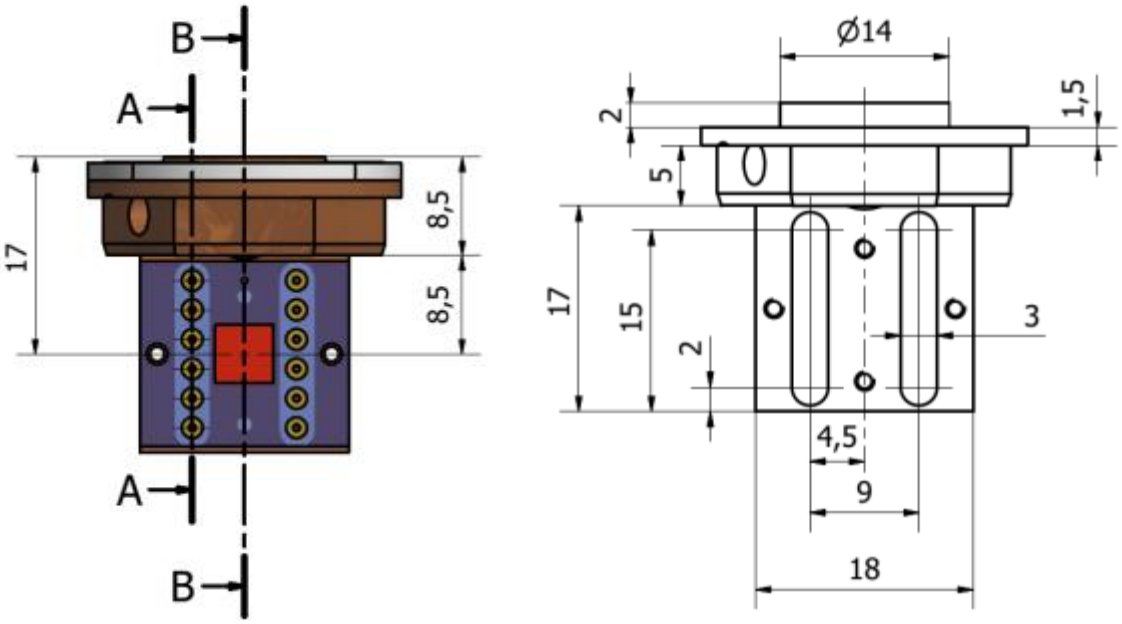

chanfrein 1x15°



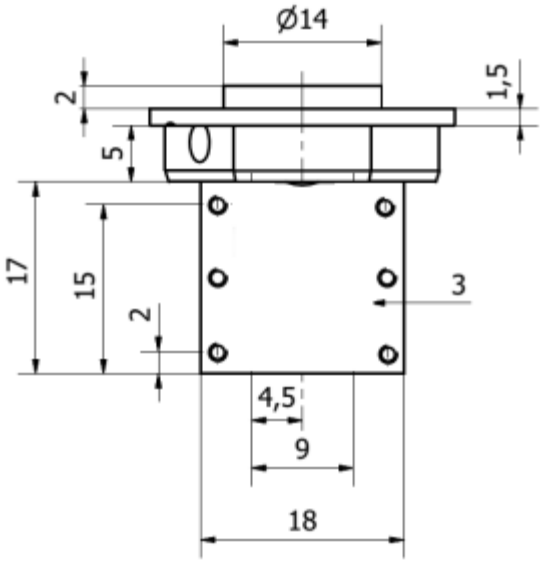

- *With φ rotation* (useful surface ∅ ~8 mm) pour le **CroMag** (numéros type R##):



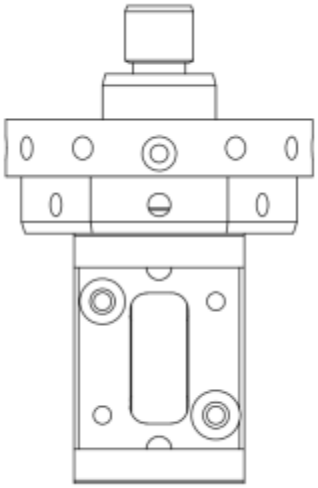
- *V²TI pour contacts électriques* pour le **V²TI@MagneTwo** (numéros type V##) :

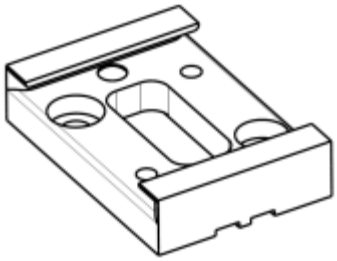



- *Bloc V²TI* pour le **V²TI@MagneTwo** (numéros type V##) :
  *Réalisés sur la base des blocs pour PCB mais avec une surface plane de Cu.*



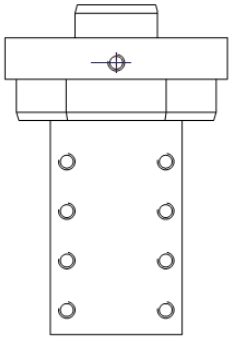

- Bloc de cuivre pour faire ascenseur entre sas et MagneTwo pour le **milleK@MagneTwo** : c'est un bloc de cuivre qui accueille le porte plaquettes Omicron de FerroVac de type RECOM(ST) (numéros type A##).





## 2. Sample holder alignment

The alignment of the beam on the sample will depend of the kind of sample holder: while $T_x$ depends mainly on the positioning of the CroMag and the alignement of the beam (Wolter…) and to a lesser extent to the value of the $R_z$ rotation, $T_z$ depends mainly on the temperature (something like 10 µm each K) CroMag and the alignement of the beam.

| | | $T_Z$ *(valeurs approximatives)* | | | | | |
|---|---|---|---|---|---|---|---|
| | | l=26 mm (*long*) | | l=16 mm (*short*) | | l=28 mm (*Omicron*) | |
| | | 300 K | 4 K | 300 K | 4 K | 300 K | 4 K |
|  | | [19…**32** mm…45] | [16…**29** mm…42] | [19…**27** mm…35] | [16…**24** mm…32] | [19…**33** mm…47] | [16…**30** mm…38] |
| $T_x$ | *ring* | [-4…**4.3** mm…12] | *hall* | | | | |

## 3. Temperature on the sample holder

The temperature on the sample will always depend on how good the thermal contact is between your sample and the sample holder…

For the temperature on the sample holder it can be estimated knowing **TA** and **TB** from the insert:

- **TA** is the temperature of the exchanger.
- **TB** is the temperature below sapphire very close to the sample.

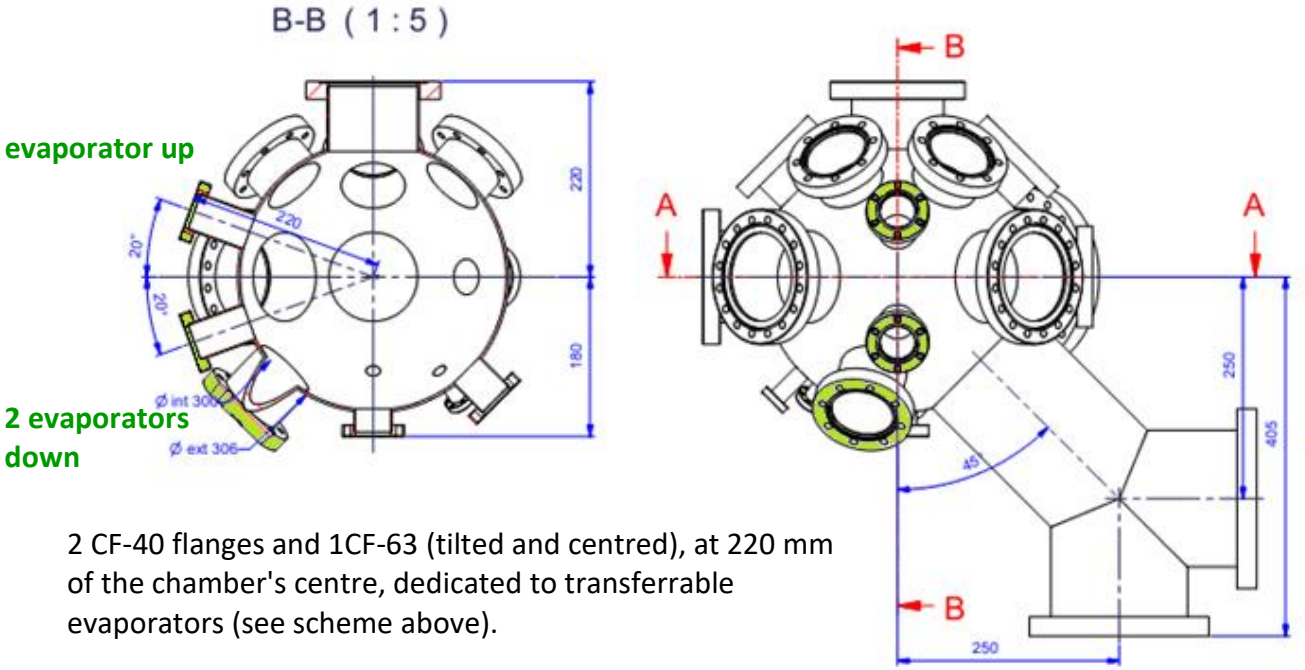
Using the Omicron plate system also leads to some loss in temperature but mainly below 4K (expected one has wait the long enough for the temperature to go at the equilibrium):

- TB = 4.2K $\Rightarrow T_{sample} \sim$ 4.4K
- TB = 1.5K $\Rightarrow T_{sample} \sim$ 2.5K

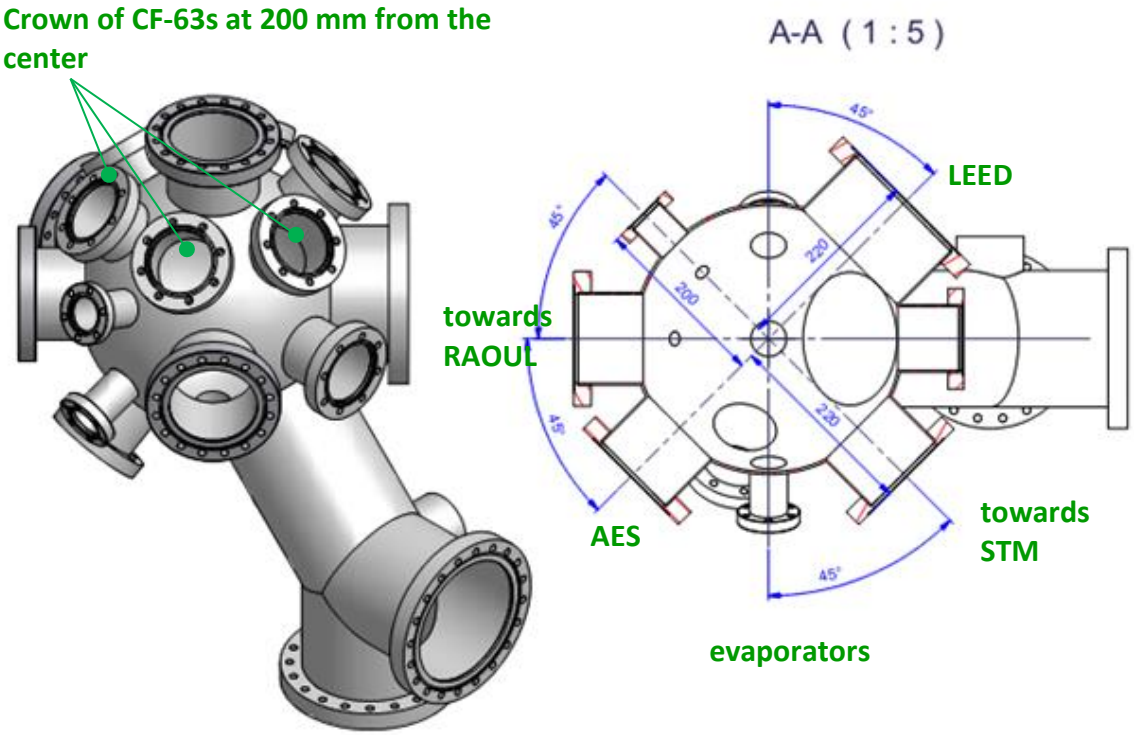
## II. Sample environment in the preparation chambers

The sample preparation can be performed in the so-called MBE chamber (for clean preparation and offering several *in situ* facilities: AES, LEED, STM…) or the chamber RAOUL and "Raoul petite" (for less clean preparation…).
Evaporations are usually performed with transferrable evaporators which allow intervening without venting the whole chamber.

### 1. MBE chamber:



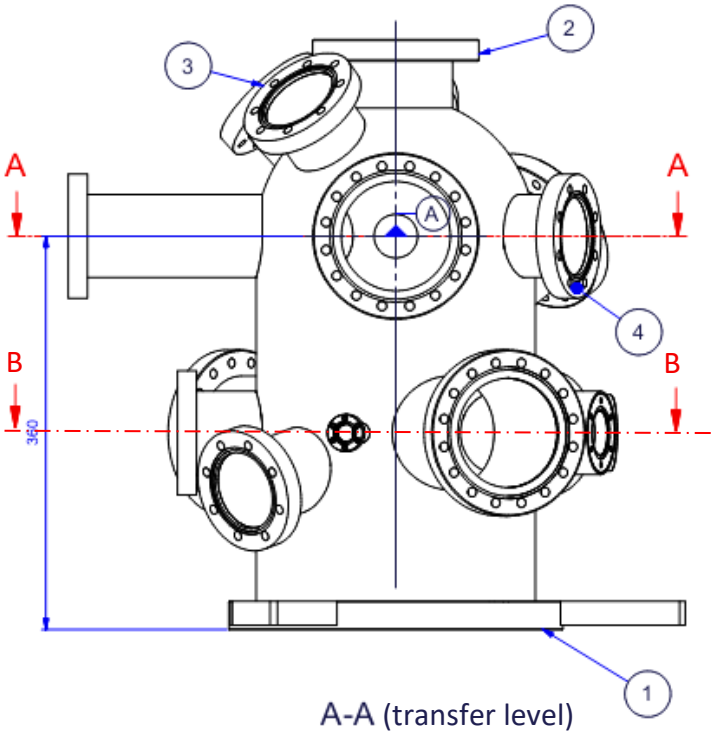

2 CF-40 flanges and 1CF-63 (tilted and centred), at 220 mm of the chamber's centre, dedicated to transferrable evaporators (see scheme above).



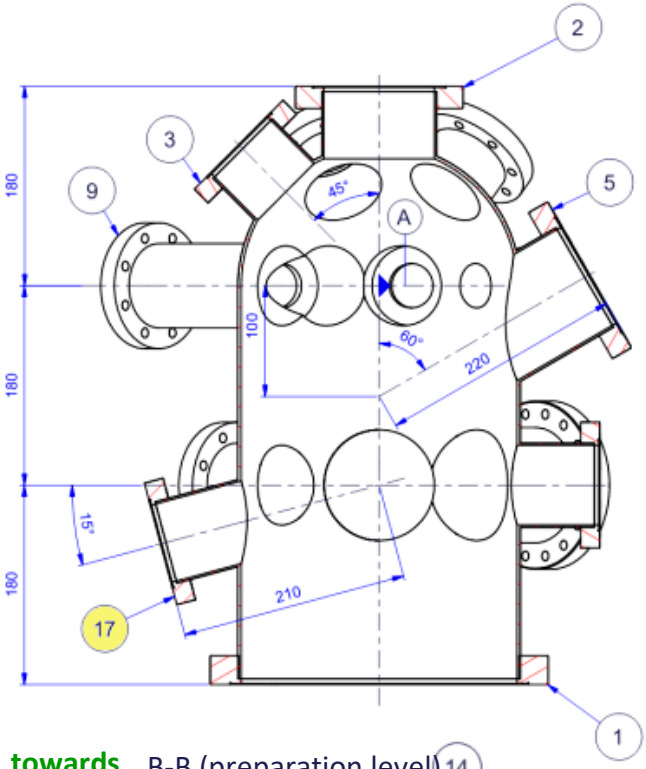
## 2. RAOUL chamber:

This chamber has 2 working levels:

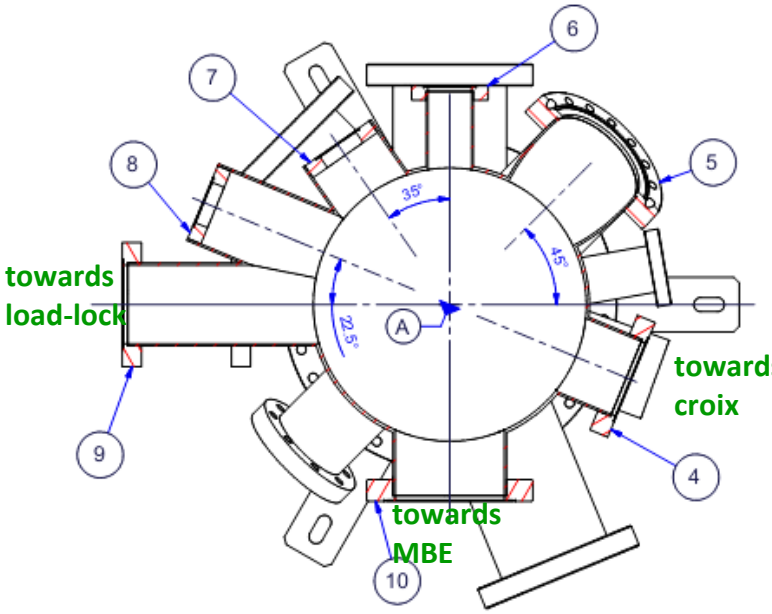
- The up level is dedicated to sample transfers.
- The bottom level is dedicated to preparations.



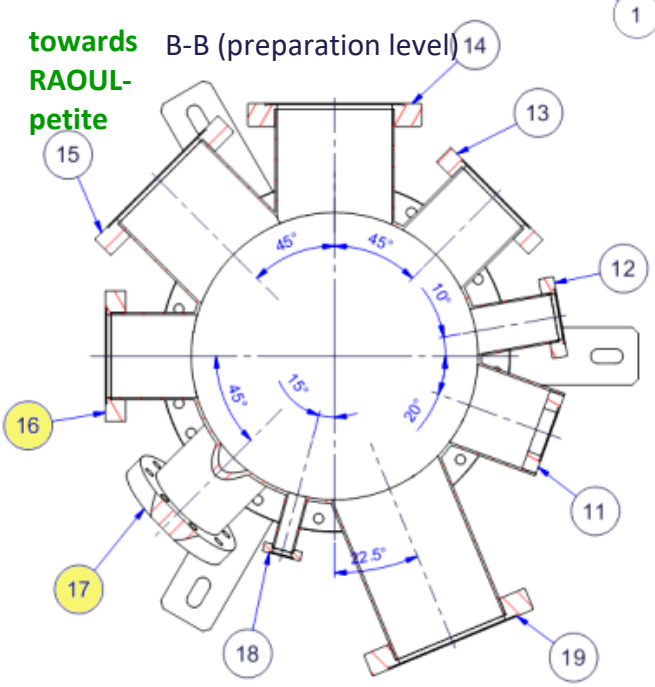

A-A (transfer level)




B-B (preparation level)




towards RAOUL-petite



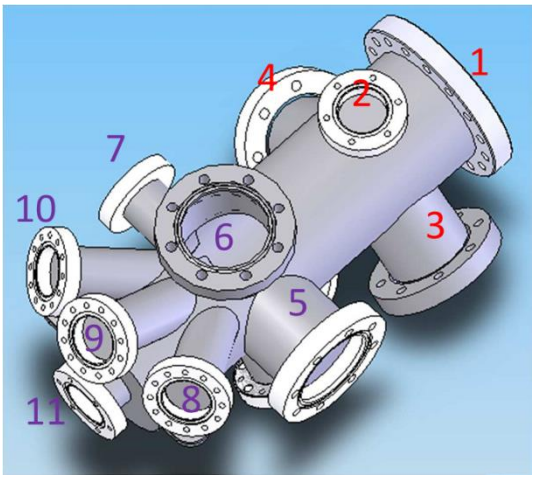

| Liste de pièces | | | |
|---|---|---|---|
| REPERE | DESCRIPTION | SUR TUBE | DISTANCE REF A |
| 1 | CF250 | 250 / 256 | -360 |
| 2 | CF100 | 100 / 104 | + 180 |
| 3 | CF63 | 72 / 76 | 180 a 45° |
| 4 | CF63 | 72 / 76 | 180 |
| 5 | CF100 | 100 / 104 | voir fichier Raoul1 |
| 6 | CF40 | 40 / 43 | 200 |
| 7 | CF40 | 70 / 73 | 180 |
| 8 | CF40 | 70 / 73 | 245 |
| 9 | CF63 | 72 / 76 | 300 |
| 10 | CF100 | 100 / 104 | 180 |

| Liste de pièces | | | |
|---|---|---|---|
| REPERE | DESCRIPTION | SUR TUBE | DISTANCE CENTRE |
| 11 | CF40 | 70 / 73 | 200 |
| 12 | CF40 | 40 / 43 | 200 |
| 13 | CF63 | 72 / 76 | 200 |
| 14 | CF100 | 100 / 104 | 220 |
| 15 | CF100 | 100 / 104 | 220 |
| 16 | CF63 | 72 / 76 | 200 |
| 17 | CF63 | 72 / 76 | 210 |
| 18 | CF16 | 16 / 19 | 180 |
| 19 | CF100 | 100 / 104 | 270 |

### 3. RAOUL-petite chamber (connected to RAOUL CF100 flange #15):

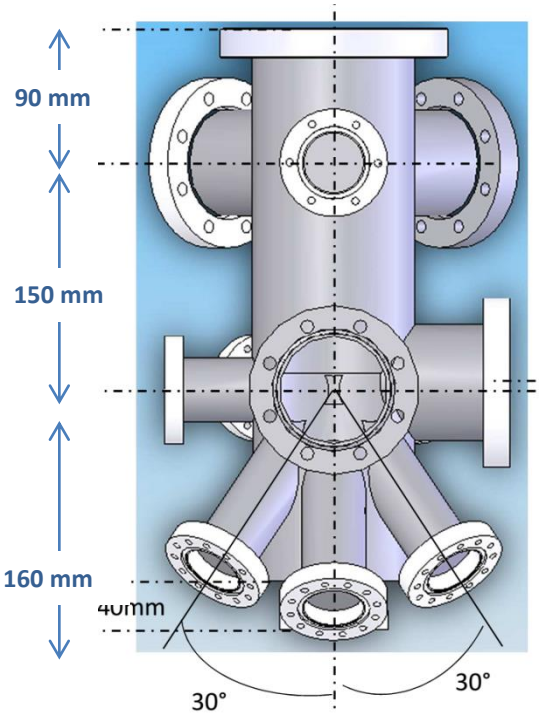
This chamber is fully dedicated to preparation (with a heavy load on the UHV) on Omicron sample plate. The users' available flanges are:

- 4 CF40 flanges (on the bottom) to install pointing up evaporators (flanges at 110 or 130 mm to the centre).
- 3 CF40 flange (on the top, #8 to 10 on the drawings) for viewports and quartz balance (flanges at 170 or 190 mm to the centre).
- 1 CF63 flange on the side (#5 on the drawing) for cleaving (or other manipulation) (flanges at 120 mm to the centre).

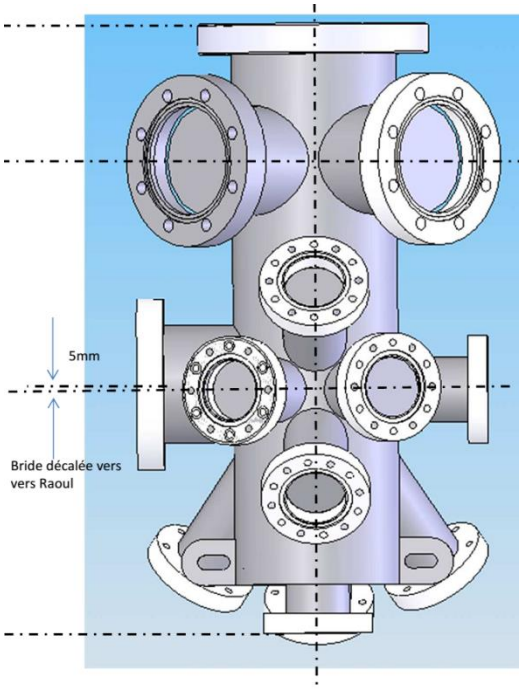



| | |
|---|---|
| **1.** | Connection to Raoul chamber |
| **2.** | View port |
| **3&4.** | Pumping |
| **5.** | Tool (cleaving, scrapping, …) (120 mm to the centre) |
| **6.** | View port |
| **7.** | Sample holder |
| **8&10.** | View ports (170 mm to the centre) |
| **9.** | Quartz microbalance (or other tool) (190 mm to the centre) |
| **11.** | Tranfert rode |
| **12-14.** | Evaporators (bottom flanges) (110 or 130 mm to the centre) |

*Top view*

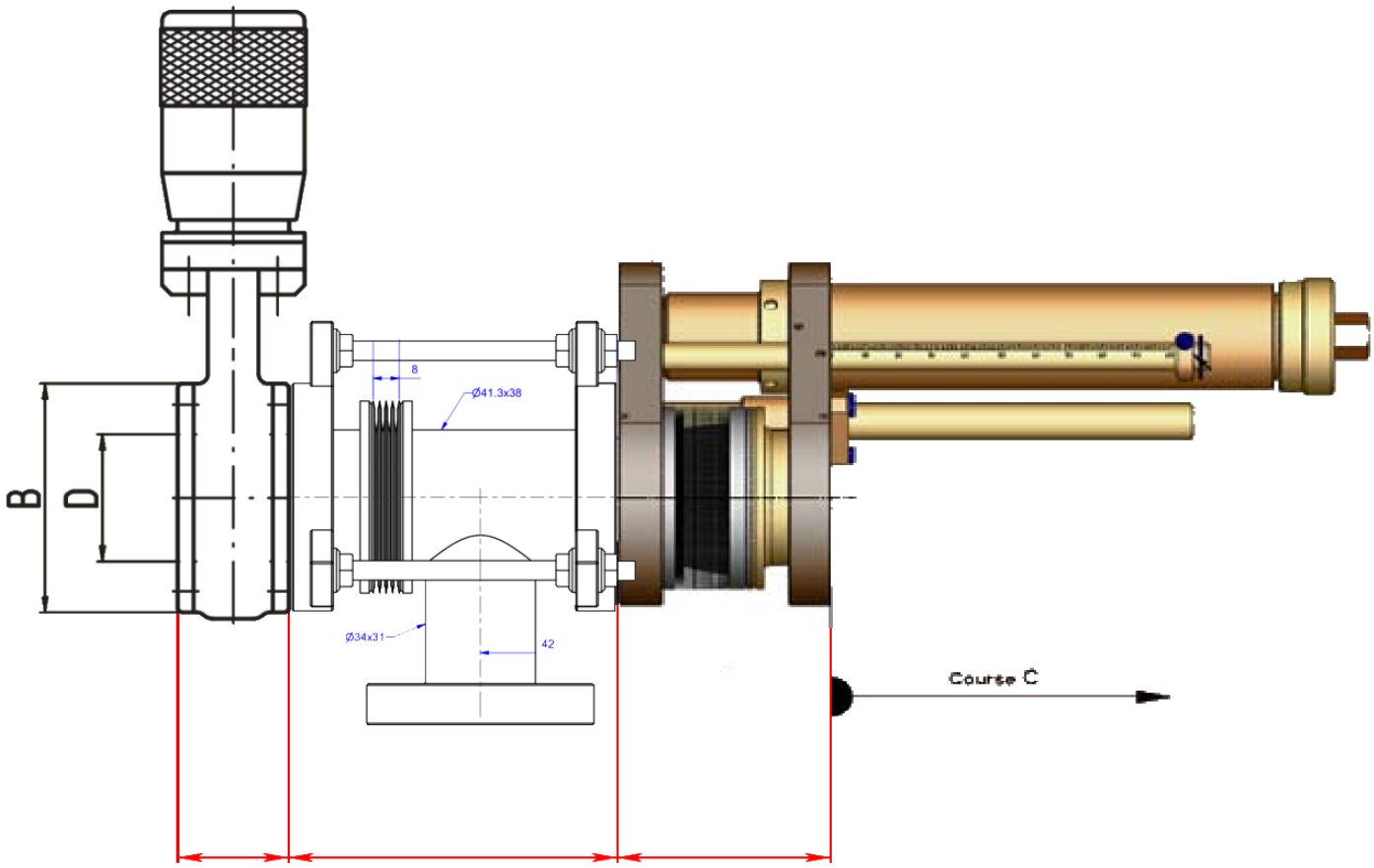



*Bottom view*



**4. CF40 transferrable evaporators:**

- A VAT CF-40 valve (serie 01): thickness 35 mm.
- Pumping cross (with a port-aligner): length 100 mm
- CF40 translation with the appropriate length: 100 mm (minimal length of 63 mm) or 150 mm (minimal length of 75 mm)).




**35 mm** **100 mm** **min. 63 mm / max. 163 mm (translation 100 mm)**
**min. 75 mm/ max. 225 mm (translation 150 mm)**