

Dilution Fridge Particulars

Sample Mounting and Height Adjustment

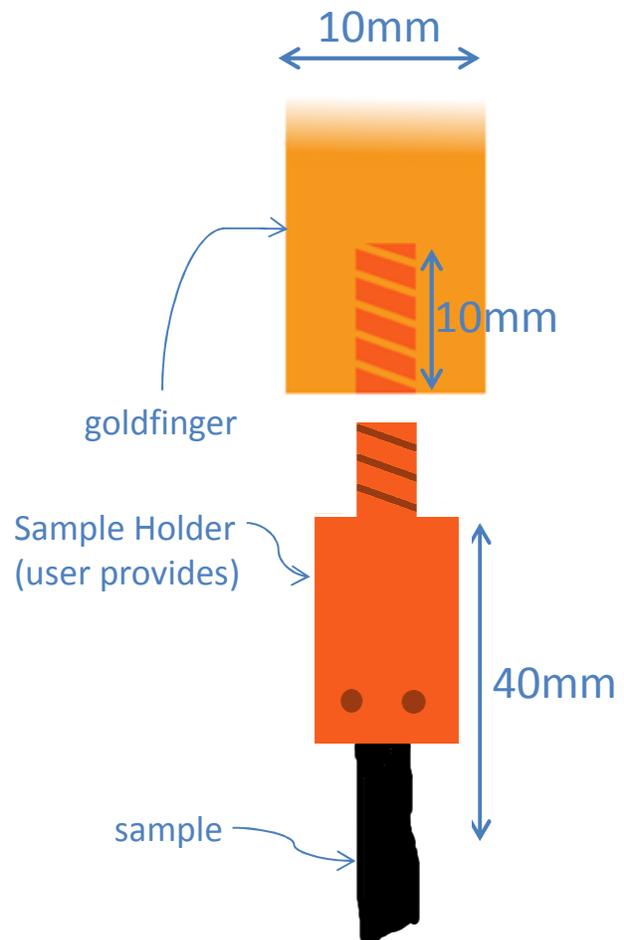
The split between the coils is 20mm. As far as sample mounting is concerned, this is important because it acts as a mask of sorts, so anything that extends beyond that 20mm window will not scatter neutrons.

The diameter of the bore is effectively reduced to 10mm when using the dilution fridge. The inside diameter of the IVC can at beam position is 14mm, but if your sample/holder is larger than 10mm in diameter you're taking two big risks:

- (1) When you load your sample you mess up the alignment or even break it by hitting/scraping it along the edge of the IVC can.
- (2) Your sample makes physical contact with the IVC can and thus never gets colder than 1K.

There is a gold-plated copper finger, the "goldfinger" that you will mount your sample onto. It is 20cm long, with an M6 tapped hole 10mm deep for sample mounting. Thus your mount/cell should have an **M6** bolt less than 10mm long.

It is highly recommended that you make your mount/cell out of copper. It should be approximately **40mm** long from shoulder to sample center. Significant deviations from this will mean your sample is out of the beam. Use of adapters is discouraged unless absolutely necessary – using an adapter may slow cooling and raise the actual base temperature.



Cartoon – not to scale!

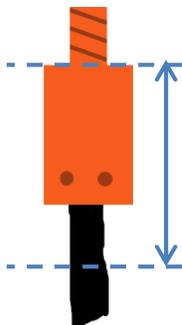
Dilution Fridge Particulars

Sample Mounting and Height Adjustment (continued)

We need to make sure the height is going to work out.

- The IVC has a thinned-down window, and so long as the user follows these instructions for making a sample holder, the sample will be centered in that window. So let's take that as beam center. I'm stating distances relative to the "taper" because this is a common point on the insert and the IVC.
- So the IVC: taper to beam center = 57cm or 570mm
- And the insert: taper to end of goldfinger = 53cm or 530mm
- The difference sets the length of the sample with sample holder to be 40mm.

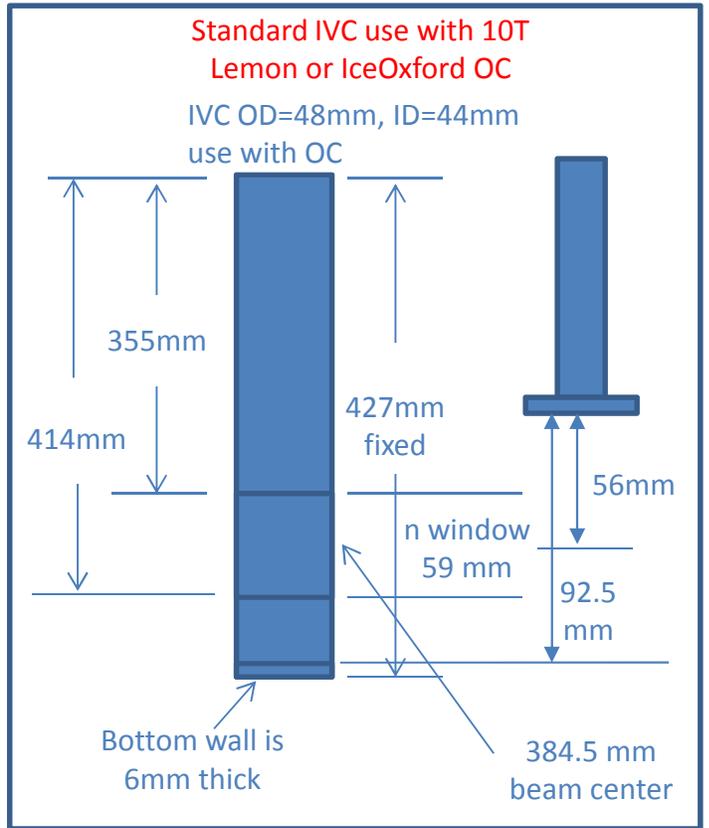
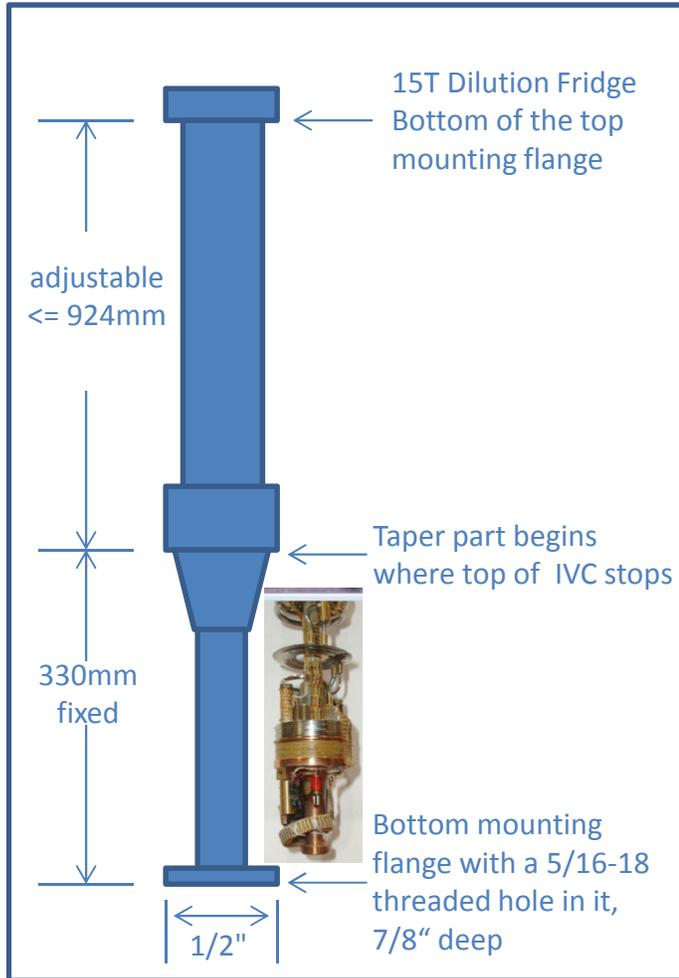
- With the sliding o-ring flange at its highest realistic position (that is, 1cm lower than its absolute highest position to make room for a clamp), the insert flange to taper distance is = 91cm or 910mm.
- Thus total distance flange to beam center is 910mm + 570mm = 1480mm.
- Yay! This is within the range of the magnet depth with height jig in place!
- What it all means then, is this:
 - For the dilution fridge, if one mounts his sample so that it's in the middle of the thinned-out portion of the IVC, like he was told, then he should adjust the motion jig to make the magnet depth = 1480mm, that is the gap should be set to
$$g = 61mm.$$
 - The operator should adjust the clamp to hold the double o-ring flange at it's top-most position and verify that the distance from there to the thinned out part of the IVC is 1480mm.
 - If the sample is 13mm or more TOO SHORT it will not fit. Ideally you should make a new sample holder (adaptors not recommended).
 - It's fine if the sample too short by 12mm or less. If the sample is too long, It's okay so long as it fits in the IVC, and you don't mind a bit more material in the beam. In either case, adjust the motion jig gap as described in "Sample Mounting and Size Restrictions."



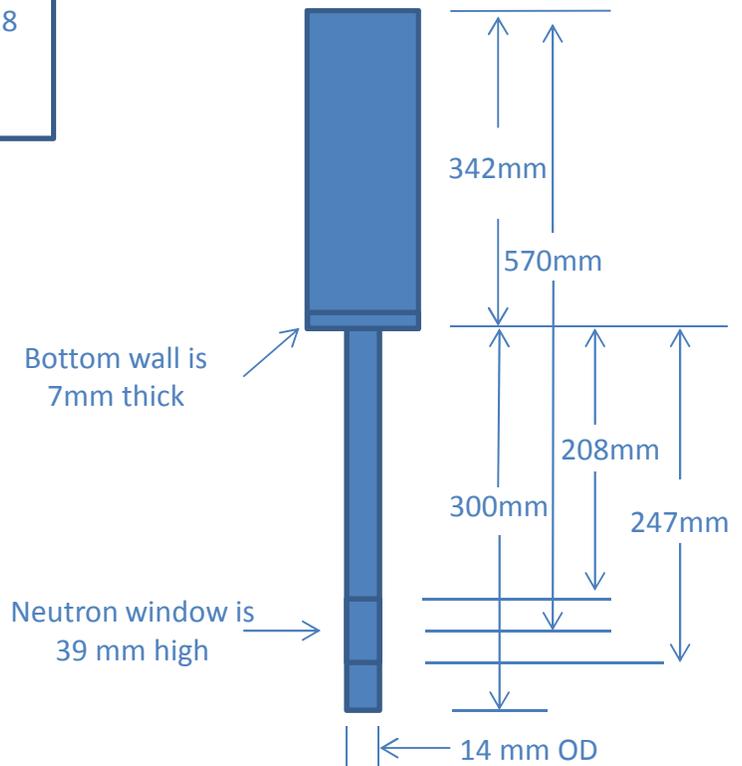
This distance (for simplicity I'm calling it the sample) **should be 40mm**. It can be made to fit so long as it's greater than 28mm as described above. In all cases, be careful that the sample doesn't hit the bottom of the can (there is 65mm space below beam center.)

Dilution Fridge and ICEoxford OC

Sample Mounting and Height Adjustment



Golden IVC use with 15T magnet



For using with ICEoxford OC/HFBS OC, the distance between the top flange to beam center is 1305mm, plus 4mm Oring =1309mm. With the 15T DR's flange on the very top position, after mounting the cylindrical IVC, the distance between the bottom of the flange and the center of the neutron window is 1310 mm. Perfect fit!

There is 1.5mm space between the top of IVC and top of the taper part. After mounting on the IVC, $924+1.5+384.5=1310$ mm. So the **center of sample needs to be 384.5+1.5-330=56 mm below the MC mounting hole**. Maximum length is 90 mm. Otherwise touching the IVC bottom. **Active length is 56+-29cm**. Sample **diameter ≤ 33 mm**. Sample holder needs to have a 5/16-18 **bolt $\leq 3/8$ " long** or a 5/16-18 threaded hole.

A 12mm long copper adapter has been made so 56 mm can be reduced to 44 mm.