



Thesis project:

Mucosal rheology in the airways
of patients with severe lung disease

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PROCEDURE FOR CALIBRATING AND COMMISSIONING THE MCR 302 RHEOMETER

This annex, introduced in Chapter n. 2 of thesis aims to explain how best to calibrate the rheometer. This is a very delicate operation, which is crucial for the successful analysis of samples.

Getting Started Procedure – MCR 302 Rheometer

1. Check that the desired measuring plate is in place, or mount it:

1. Flat plate for CP (supported by 3 screws)
2. Plate with bucket for DC (simply nested)

To change the measuring plate, open the side covers of the rheometer. Next, disconnect the grey auxiliary cable (AUX1) and the red cable (TD1). To bring out the plate, simply lift it from below.

3. Verify the rheometer upgrade using the bubble level.

To level, position the bubble level with 3 different orientations on the rheometer plate to scan 360°. At each orientation, make sure that the bubble is between the two lines by playing on the height of the feet of the rheometer.

4. Start the compressor with the button on the back.
5. Open the air valve (red) located at the back of the compressor.
6. Connect the rheometer power cable.
7. Start the rheometer by pressing the ON/OFF button on the side, then wait for it to initialize and display "Status OK".
8. Start the computer, and then launch the RheoCompass 1.24 software.

Wait at least 1 hour before performing the following operations.

9. Open the Control Panel on the right side of the screen by clicking <<.
10. Clicking on "Initialize" → the device initializes.
11. Enter the desired working temperature in the corresponding box, then click on "Regulate".
12. Remove the black torque protective cover by unscrewing it.

CAUTION: The compressed air must never be stopped as long as the torque protective cover is absent!

13. Engine inertia

In the menu bar, choose "Measurement set", then click on "Service function", then "Adjust motor inertia". Check the previous inertia which must be about 0.09 mN.m.s². Then click on

"Start adjustment". Wait. Finally check that the value of the new inertia is close to the old one before clicking on "Save", then "Close".

14. To mount the desired measuring system (CP, CC, PP...), the coupling sleeve must be moved upwards, then the measuring system inserted into the coupling, ensuring that the mark line is aligned with the notch.

15. For CP and PP geometries only. → In the control panel on the right, click on "Set air gap to zero", then wait for the mobile to go down to 0 mm.

16. Inertia measuring system

In the menu bar, choose "Measurement set", then click on "Service function", then "Adjust measurement system inertia". Check the previous inertia which must be about 0.001 mN.m.s^2 . Then click on "Start adjustment". Wait. Finally check that the value of the new inertia is close to the old one before clicking on "Save", then "Close".

17. Motor adjustment (1 time per day and per measurement system)

In the left sidebar, choose "My Apps", then choose "Verification & Adjustment" in the black bar at the bottom of the screen. Choose the appropriate program according to the measurement system used, then start the adjustment. At the end of the adjustment, all points must be within the tolerance interval.

18. Realization of a rheology measurement

- CP/PP Geometry

Fill the channel surrounding the plate with demineralized water.

Position the circular support around the plate (without the cover).

Place the sample in the center of the plate and spread it if necessary.

Lower the mobile to measuring height (see Control panel).

Shave with the spatula to remove excess sample.

Place the two pieces of lid on either side of the mobile.

Perform the desired measurement ("My applications" menu).

- DC Geometry

Fill the CC bucket with the sample to the mark line.

Lower the mobile to measuring height (see Control panel).

Perform the desired measurement ("My applications" menu).