INDIAN INSTITUTE OF TECHNOLOGY KANPUR
DEPARTMENT OF CHEMICAL ENGINEERING
PG Research lab

STANDARD OPERATING PROCEDURE

MCR 702e Rheometer

Startup Procedure-

1. Switch on the air compressor and wait for building pressure up to 6 bar.
2. After achieving pressure of 6 bar switch on Rheometer and let it boot up & shows Status OK on the rheometer screen.
3. Remove the black color protection cap of coupling.
4. Switch on PC & Open RheoCompass software then home screen will appear.
5. Click on Measuring Set and select the configuration MCR 702e.
6. Click on Control Panel present on the right side in RheoCompass software & Initialize to check the communication between the hardware and software.
7. After initializing, connect the measuring geometry to the coupling (To disconnect measuring geometry it should be moved up & to connect the geometry it should be moved down).
8. All geometric factors are saved in ToolMaster. Select the correct geometry based on the sample.
9. Set the measuring temperature in the control panel & click on Set value.
10. Once measuring geometry is detected and temperature is achieved then click on “Set zero-gap” if required.
11. After completing “Set zero-gap”, positioning buttons become active.

Measuring System - Parallel plate or Cone plate geometry

Sample loading procedure-

1. Click on the loading position to get enough space & load the sample and press the measuring position button.
2. Trim the excess sample using the trimming tool then press continue.

Sample measurement procedure

1. Go to the home screen click on test which you want to perform & save it.
2. After saving Test definition window appear → click on measurement action block→ and click on the arrow in the bottom→ Required parameters can be input in details→ click on the arrow to close the setting window.
3. Now click on start action block and press green start button.
   Put the sample name against the test name and press continue.
4. Once the test is completed it directly gives the report.

Measuring System – CTD 450

Installing CTD 450 :

1. Remove the side covers of the MCR.
2. Untighten 3 screws & remove previously mounted temperature control unit.
3. Take the sliding rail along with CTD & adjust it on the screw positions (ensure that upper coupling of MCR is at the highest position).
4. Tighten the 3 screws.
5. Mount the hose holder & check the stop cock on the air distributer is closed.
6. Connect the two short blue hoses of liquid cooling to each other.
7. Connect the two long blue hoses with the inlet & outlet of chiller.
8. Attach the two transparent air hoses to Y hose connector attach to Shaft Cooling FMU.
9. Connect the two long ends of the black heating hoses to Y hose connector attach to the Heating FMU.
10. Connect the left red Cable to the connector marked TD3 on the instrument.
11. Connect the right red Cable to the connector marked TD4 on the instrument.
12. Open the Chamber of CTD & place lower part of the unit into CTD and align with the guide pin.

Sample loading procedure:

1. Go to control panel and initialize it.
2. Mount the upper measuring system and set zero gap if required.
3. Moved to measuring position & close the oven.
4. Make sure that flow rates have been adjusted to the correct value.
5. Send the measurement temperature & wait till it become stable (around 20 min).
6. Open the oven & move up the measuring system, load the sample & close the oven then start the measurement.
7. After this follow Sample Measurement Procedure.

Measuring System – Interfacial Rheology System

Installing IRS:

1. Place the IRS cup on the temperature device (peltier) & tighten by hand only.
2. Attach Bi-cone measuring system to the coupling (Zero gap position has to be set).

Sample loading procedure:

1. Pour the lower phase liquid into the IRS cup. For interfacial rheology system, fill in 109.6 ml of the sample into the cell. If you have interfacial rheological cell for lower sample volume, fill in 36.7 ml. For the IRS-DWR 19.68 ml are needed.
2. In the control panel set target temperature for the measurement and click set. Wait some time for the temperature to stabilised.

Sample measurement procedure

1. For Bi-cone geometry, load the template My Apps >Interfacial shear- Find measuring position (IRS) & start the test definition contained therein.
2. After starting the test definition, you will be prompted for a waiting position (Reference for the surface detection) then click on continue.

Measuring System – Tribology-PID

Installing T-PID

1. Move the Measuring Head of MCR to the highest position.
2. Attach the Measuring Cup of T-PID to the Peltier and tighten with hands only.
3. Attach the Measuring System of Tribology to the head of Rheometer.

Sample loading procedure:

1. Place the sample in the Measuring Cup of T-PID.
2. In the control panel set target temperature for the measurement and click set. Wait some time for the temperature to stabilised.

Sample measurement procedure:

1. Select the tab **Operational Settings** & change the entry "**For usage with measuring system types**" to Tribology.
2. Create a new project from a suitable template which contain all the settings for temperature, normal force, sliding speed, torque etc (if necessary these parameters can be changed).
3. Save the project & Reset normal force in the control panel then start the measurement procedure.
4. After measurement clean all sample holding parts.