**Standard Operation Procedure for MOUDI**

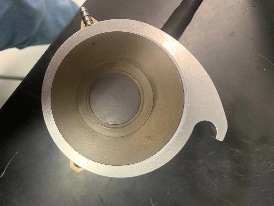
**Checklist before Assembly:**

1. Prepare the vacuum pump that provides the flow rate of 30 L/min for MOUDI operation.
2. Set the system at a low dust indoor environment, and prepare suitable distances between the pump and MOUDI to minimize the noise effect to the surrounding.
3. Check the parts listed in the table below.

|  |  |  |
| --- | --- | --- |
| Name | Quantity | Picture |
| MOUDI inlet | 1 |  |
| Impactor plates, type A (with O-ring) | 4 |  |
| Impactor plates, type B (with O-ring) | 4 |
| Filter holder | 9 | C:\Users\hry09\AppData\Local\Temp\WeChat Files\ea980411df6e3d1532a0c1342ca1ce4.jpg |
| MOUDI outlet stage (with after filter holder) | 1 | C:\Users\hry09\AppData\Local\Temp\WeChat Files\7f0a1b33c0a092c41a96ea474056f2d.jpg |
| Magnehelic pressure difference gauge (0-40 in wt, with conductive tubing) | 1 | C:\Users\hry09\AppData\Local\Temp\WeChat Files\65b18f4477be9ad8b40043dab52f651.jpg |
| Magnehelic pressure difference gauge (0-150 in wt, with conductive tubing) | 1 |
| Rotameter (0-100 scfh, with conductive tubing) | 1 |  |
| Valve (with PVC tubing and fittings) | 1 |  |
| Long thick conductive tubing for sampling | 1 |  |
| Long PVC tubing for pump extension | 1 |  |
| Short conductive tubing for pump extension | 1 |  |
| Triangle stand for MOUDI | 2 |  |
| Rod with screw tip | 3 |  |

**Assembly procedure:**

1. Set the triangle stand (with screw thread) on a horizontal bench where the MOUDI will be set for sampling.
2. Gently rotate and open the last stage, take the after filter holder down.
3. Open the after filter holder, place a preweighed 37 mm Quartz filter onto the holder plate.
4. Put the holder cap back onto the holder plate, and make sure the pin on the cap is inserted into the hole on the plate. **Note: Quartz filter is easy broken, be careful not to cut the filter in this step!**
5. Place the after filter holder (with the after filter) back onto the after filter stage. Close the last stage by screw back and tighten the upper part (with o-ring) of the last stage. **Note: The white colored o-rings are always placed on the impactor stages. These o-rings are used to maintain the gas tightness. Do not lose them.**
6. Place the last stage of MOUDI on the triangle stand which was set in Step 1. Do not block the bottom thread with the rotating section (See picture below) of the stage.

Correct direction Wrong direction (the thread is blocked by the rotating section)

1. Open a filter holder, and place a preweighed 47 mm Quartz filter, record the number of the filter.
2. Close the filter holder, and place the filter holder (with the filter) on the last stage of MOUDI.
3. Stack the stage with the ID “8B” onto the last stage. Make sure the sealing between two stages is air tight by pressing it.
4. Repeat Steps 7-8 to put the filter holder on the 8B stage.
5. Repeat Steps 9-10. Gradually stack the remaining stages from 7B to 1B in a descending order, and place the filter holders (with the preweighed filter) onto each stage respectively right after the placement of each stage. Record the number of all filters according to the stage sequence. This is important for filter tracking when weighing these filters!
6. Place the MOUDI inlet on the Stage 1B.
7. Place the other triangle stand on the top of MOUDI. Align the holes to the threads on the bottom triangle stand, and align all the rotating sections in Type B impactor plates.
8. Insert the rods through the top triangle stand into the bottom triangle stand. Screw the rods till finger tight. The sampler MOUDI is set up.
9. Connect the Magnehelic pressure difference gauge (0-40 in wt) with stage 5B via the gas outlet beside the tag A. Put the magnehelic gauge on the table.
10. Connect the Magnehelic pressure difference gauge (0-150 in wt) with the last stage via the gas outlet beside the tag B. Put the magnehelic gauge on the table.
11. Connect the MOUDI outlet on the last stage to the valve with conductive tubing. Clamps might be used to ensure sealing.
12. Connect the other end of the valve to the inlet of vacuum pump with conductive tubing. Clamps might be used to ensure sealing. **Note: The flow direction on the valve should obey the actual direction, i.e. from MOUDI to the vacuum pump.**
13. Connect the MOUDI inlet with the rotameter module.
14. Turn on the pump, and adjust the valve opening to reach 30 L/min flow rate which can be read from the rotameter.
15. Unplug the rotameter module and assemble the sampling conductive tubing onto the MOUDI inlet. **Note: The pump does not need to be turned off in this step, unless changing the tubing is difficult.**
16. The MOUDI is collecting the size-resolved PM from the sampling point at 30 L/min now. Record the pressure drop at this time point. The acceptable pressure drop upper limit is 10 in wt and 95 in wt for the gauges assembled at A and B point, respectively.
17. Check and record the pressure drop once per day in the sampling period. If the pressure drop increases significantly, readjust the flow rate by replacing the sampling tubing with the rotameter module, and altering the opening of the valve. After this step is performed, reconnect the MOUDI inlet to the sampling tubing.

**Disassembly procedure:**

Disassembly is the reverse operation of assembly.

1. After the sampling is completed, turn off the pump, and disconnect the magnehelic gauges, valve and sampling inlet tubing.
2. Unscrew the rods from the bottom triangle stand, and remove the top triangle stand with the three rods.
3. Remove the MOUDI inlet.
4. Separate all stages, and place these stages on the bench following an order.
5. Gently open the filter holder on the stage 1B to avoid any breakup or tearing. Place the filter on the filter holder to its original petri dish (recorded in the assembly process).
6. Repeat step 5 for all filters on the filter holders which were placed on the stages 2B – 8B and the last stage.
7. Open the last stage, very carefully open the after stage filter holder. Place the after filter to its original petri dish.
8. Stack the plates back to save space, or store all plates in a secured place.
9. Store all the assembly items (e.g. conductive tubings, valves, magnehelic gauges etc.) in a secured place.