JEOL1400 ACD (anti-contamination device)

Last update: 19.01.2026 by HM

--- Please request a demonstration by Hetty before using the ACD ---

Safety

Liquid nitrogen is an asphyxiating gas: use in well-ventilated spaces. To prevent burns due to the intense cold, please use appropriate PPE: thermos gloves and safety glasses. They are stored next to the dewar.

Protocol

Overview of the steps

Using the anticontaminator device (ACD) consists of 4 steps:

1. The ACD has to be filled with liquid nitrogen before the onset of imaging.
2. When needed, top up the liquid nitrogen
3. After you're done, you have to start a bakeout cycle. The bake-out takes about 2 hrs.
4. Once the bake-out is completed, please restart the HT.

1 - Cooling the anticontaminator

- Put a teatowel on the left subpanel
- Place the lid on glass viewing window
- Fill the ACD tank with ~½ thermosflask of liquid nitrogen, using the funnel
- Put on the lid
- Wait until the boiling stops (5 min?)
- Add rest of the flask of liquid nitrogen.

2 - Top up the liquid nitrogen during the imaging

- One thermosflask of liquid nitrogen should last about 8 hrs.

3 - Starting the bake-out

- Remove the holder from the column as usual.
- Put a teatowel on the left subpanel
- Place the lid on glass viewing window
- Remove objective aperture from the TEM column
  - Only the objective aperture, do not touch the condenser aperture
- Insert the coolant evaporator
  - Stored in the wall-cabinet.
  - Be careful when inserting – liquid nitrogen might be expelled from the tube! Always make sure it is pointed away from you.
- Turn off the HT
- Start bake-out (see Figure 1)
  - go to "Control (C)" -> "Maintenance (T)" -> "ACD (A)"
  - in "ACD Controller" -> select "ON"
- After 2 hr, restart the HT

4 – Restart the HT

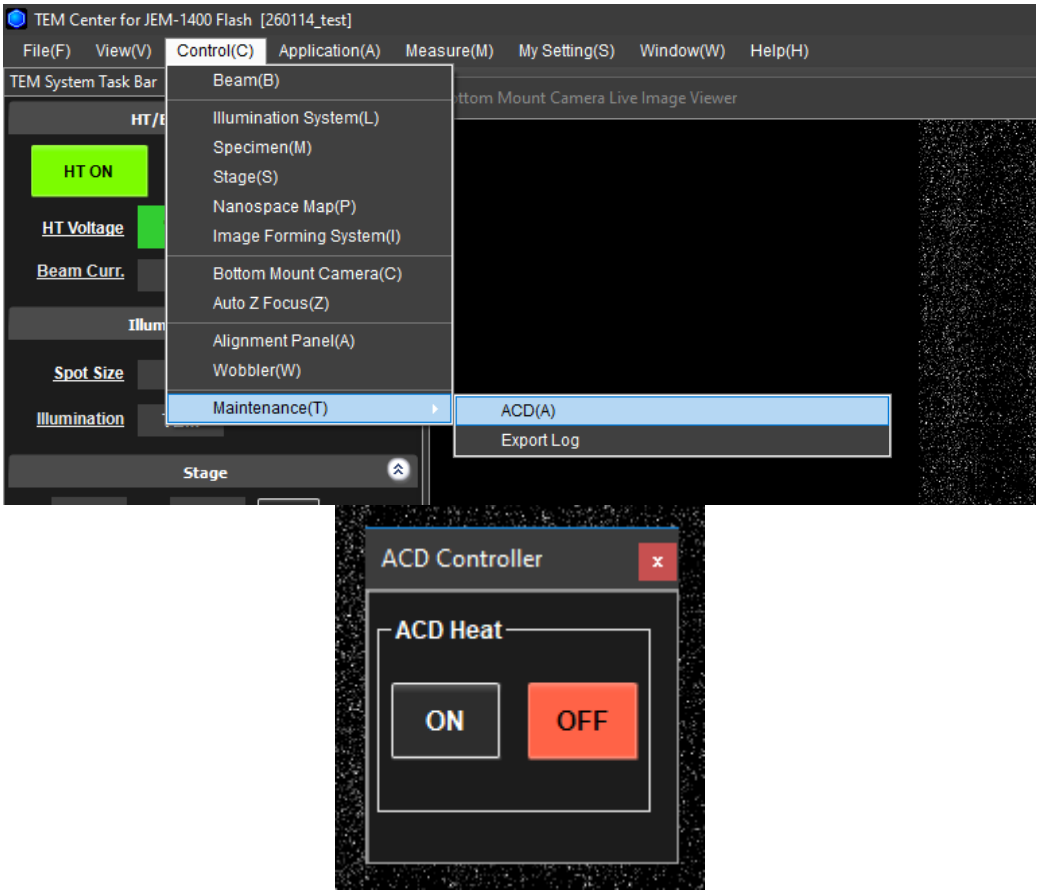

Figure 1: how to start the bake-out cycle

Background information

- The anticontamination device (ACD, or cold trap) improves the vacuum inside the TEM column. It consists of metal parts inside the TEM column, near the sample, that are cooled by the liquid nitrogen. Evaporating contaminants from the sample will stick to the ACD and freeze.
- After each session, you run a bake-out cycle where the ACD is heated. The contaminants will then evaporate from the ACD and are pumped out of the column.
- If the ACD heats up while the TEM is still in use, the contaminants will be released, and the vacuum will deteriorate badly. Therefor it is important that the dewar doesn't run dry. The 1400 will use about 1 thermos flask of lN2 for one day (8 hr imaging).
- You cannot use the ACD for longer than 24h without running a bake-out cycle.