Introduction

The Thermo Scientific Blue M tube furnace is for general purpose annealing.

Feature and specifications

1) Ambient gas: N2 and forming gas (5% H2 95% N2)
2) Gas flow rate range: 0-10 LPM
3) Three-zone temperature control
4) Temperature range: Room temperature to 950 degrees.
6) Maximum sample size: 4"

Safety

1) Hot surfaces. Wear thermal gloves.

Precautions

1) The samples should not outgas at the temperature setpoint. If you are not sure, contact staff for approval.
2) Sample holders and quartz parts are fragile. Handle with care.

Operating Procedure

1) Activate the equipment in NUcore.
2) Switch on the power ON/OFF breaker.
3) Loading sample
   3-1. Open the tube by removing the endcap on the right end and gently place it on the quartz plate on the lower level of the wire rack.

   3-2. Place samples on the wafer boat. Insert the boat into the tube. Use the quartz rod to push in to the center of the tube.

   3-3. Close the tube end with the quartz endcap.
4) Start gas flow (optional)
   4-1. Adjust the valve position at the left of the furnace to select the gas. The valve has 3 positions. 1) 5%H₂ 95% N₂, the valve points to the wall, 2) N₂, the valve points to the operator (as in figure 3), 3) off, valve vertical.
   4-2. Turn the knob on the flow meter to adjust the flow rate.

![Figure 3: Gas flow setting](image)

5) Setting temperature.
   Start with zone 1 temperature controller, use ▲ or ▼ to change the temperature setpoint. If the setpoint changes accordingly and there is a dot after the last digit, press ‘Set/ENT’ button to register the value. The dot will disappear. If not, follow the steps below.
   5-1. Press and hold the ‘Set/ENT’ button for 3 seconds. It will display ‘modE LCL’.
   5-2. Press and release ▲ twice to select the display ‘modE LCL’.
   5-3. Press and release ‘Set/ENT’ once to select local mode. The red LED local indicator (in Fig. 2) will illuminate for zone 1 and 2.
   5-4. Use ▲ or ▼ to change the temperature setpoint.
   5-5. Press ‘Set/ENT’ button to register the value.

Repeat on zone 2 and zone 3 controllers. The furnace won’t update the setpoint until zone 3 controller is set.

6) Cooling down: After the annealing is completed, repeat step 5) to set the temperature to 20 °C for all the three zones.
7) Unloading: When the three temperatures are below 200 °C, remove the quartz endcap on the right end and gently place it on the quartz plate on the wire rack. Use the quartz rod to pull out the sample boat. Close the end with the endcap.

8) Turn the gas valve to vertical position to shut off the gas flow.