

Standard Operating Manual

Fisher Scientific Isotemp™ Model 281A Vacuum Oven

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Fisher Scientific Isotemp™ Model 281A Vacuum Oven

1. Picture and Location



This tool is located at NFF Phase II Cleanroom Class 100.

2. Process Capabilities

- 2.1 Cleanliness Standard: Non Standard
- 2.2 Substrate Size: 10mm to 150mm
- 2.3 Oven Temperature: Ambient to 280°C
- 2.4 Control Sensitivity: +/- 1°C
- 2.5 Consistency: +/- 1°C (at ultimate vacuum)
- 2.6 Vacuum Range: Atmosphere to 30in.Hg (762mm)
- 2.7 Vacuum Leak Rate: <0.5in. Hg per 24 hours

3. Contact List and How to Become a Qualified User

3.1 Emergency Response and Communications

1. Security Control Center: 2358-8999 (24hr) & 2358-6565 (24hr)

2. Safety Officer: Mr. Wing Leong CHUNG 2358-7211 & 64406238
3. Deputy Safety Officer: Mr. Man Wai LEE 2358-7900 & 9621-7708
4. NFF Senior Technician: Mr. Henry YEUNG 2358-7896
5. NFF Technician: Mr. Charles TANG 23587896

3.2 Training to Become a Qualified User

Please follow the procedure below to become a Fisher Scientific Isotemp™ Model 281A Vacuum Oven qualified user.

1. Read through the on-line equipment operating manual of the equipment;
<http://www.nff.ust.hk/equipment-and-process/equipment-operation-manual.html>
2. Attend the equipment hand-on operation training either by peer or NFF staff.
3. If training is provided by NFF staff, user must log in NFF equipment reservation system, and register these trainings.
4. Send an e-mail to Mr. Henry YEUNG requesting Fisher Scientific Isotemp™ Model 281A Vacuum Oven.
5. Pass the examination for the equipment operation and security.

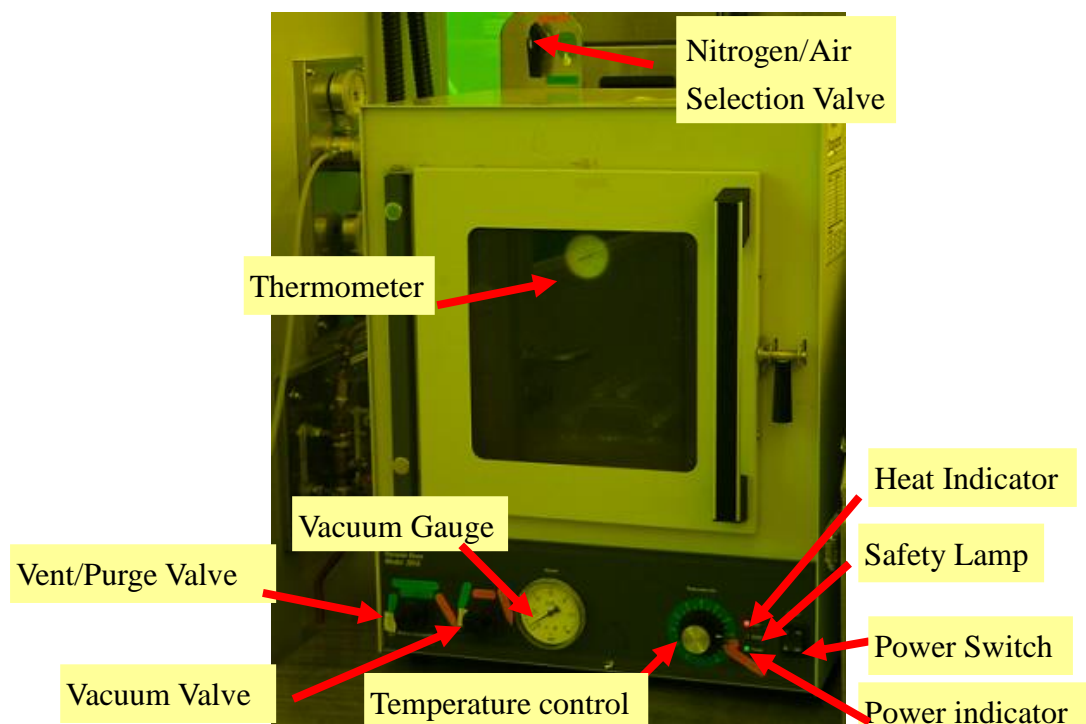
4. Operating Procedures

4.1 System Description

Fisher Scientific Isotemp™ Model 281A Vacuum Oven is a multipurpose unit that operates under reduced pressure and/or inert atmosphere.

The Vacuum Oven is equipped with a 0 to 300°C dial thermometer, which is graduated in 5° increments and mounted internally at the bottom of the oven chamber.

The thermometer can be read through the observation window.



Power Switch:	Applies power to the oven temperature control.
Temperature Control:	Regulates the oven operating temperature.
Heating Indicator:	Indicates when the oven is being heated.
Power Indicator:	Indicates when the power switch is ON.
Safety Lamp:	illuminates when controlling temperature at approximately 5° above set point.
Thermometer:	0° - 300°C dial thermometer with 2° divisions.
Vacuum Gauge:	Indicates chamber vacuum in inches of mercury.
Vacuum Valve:	Used for evacuating chamber, controlling vacuum.
Vent/Purge Valve:	Used for bleeding air or other gasses into chamber.
Nitrogen/Air Selection Valve:	Selects Nitrogen or air into chamber.

4.2 Safety Warnings

1. Follow NFF Health and Safety Manual.
2. Do not operate the unit at temperature above 280°C.
3. This is not an explosion proof oven. Do not place or use explosive, combustible, or flammable materials in the oven.
4. Resists may have irritating effects to eye, skin and mucous membranes! Observe and obey Material Safety Data Sheet (MSDS) of the corresponding materials

used in the system!

5. Do not use sealed containers in the oven chamber.
6. Do not permit materials of any kind to rest on top of unit when operating at elevated temperatures and don't touch the top plate.
7. Do not touch the oven door particularly the glass portion, with unprotected hands when operating at high temperatures.
8. The unit must not become wet during operation or maintenance.
9. Always use hot hand to remove the processed substrates from the oven.
10. Always wear safety glasses and other appropriate protective equipment when operating this product.
11. According to the general fire emergency procedure of HKUST, please report the accident to the Security Control Center first. The nature of other emergencies will determine whether you will call police, staff, or both. If someone is injured, the 9-999 emergency number should be called before calling staff. If there is a facilities problem, such as a flood or a utility problem that does not present a danger to lab users but may result in damage to equipment, the staff or FMO need to be called. The 9-999 emergency should not be called for facility or equipment problem. Always call 9-999 when a potentially life threatening situation might exist (injury, fire, gas leak, etc.)

4.3 Operation Precautions and Rules

1. Please reserve the time slot on your own, and make sure you use your own time slot to do the exposure process.
2. Please check the checklist and fill all the details of the log sheet attached.
3. Do not operate the machine unless you are properly trained and approved by NFF staff.

4.4 Initial Status Checks

1. Please check the status of shutdown notice posted in the NFF Notice Board.
2. Please check the reservation status on the website , and reserve the right time slot by your own.
3. Please check-in the equipment on your own according to the reserved time slot via card reader.

4.5 Initial System Checks

1. Verify proper function of vacuum.
2. Verify the Nitrogen available.

4.6 Vacuum Oven Operation Procedure

4.6.1 Operation in a Static Environment

Static Environment refers to operation at atmospheric pressure and with air.

1. Place samples in the oven chamber then close the oven door.



2. Turn Power Switch to ON position.
3. Slowly rotate Temperature control dial clockwise until heat indicator comes on



4. Check the Table 1 of approximate temperature setting. Set the temperature of the oven using the “manual temperature control” knob to the number indicated for the desired temperature. Wait until the oven temperature stabilizes. The temperature can be read via the thermometer in the top center inside the oven.

Table 1: Approximate Dial Settings in Static Air

Dial Setting	Temperature
2	25°C
4	55°C
6	85°C
8	115°C
10	145°C
12	180°C
14	210°C
16	240°C
18	275°C

Table 2: Approximate Heat Up Times to Various Temperatures

T _{Initial}	T _{Final}	Standard	Accelerated
25°C	100°C	75 min.	35 min.
25°C	200°C	95 min.	75 min.
25°C	275°C	120 min.	-----

5. The heat up time is relatively slow. User can check approximate heat up times at Table 2. To speed up the oven heating rate, user can set the dial 2 setting above the desired temperature. Observe the thermometer. When the temperature will reach the desired temperature (i.e. less than 20 °C), set the dial 2 settings lower. The oven can reach the final temperature quicker using this method.
6. After the baking time is up, set the “Manual temperature control” to 0, turn off the “Power Switch”.
7. After the temperature decrease to less than 100°C. Close the “Vacuum Valve” and open the purge/vent valve to vent the oven. Open the oven door and remove your sample.
8. Close the purge/vent valve and the door.

4.6.2 Operation in a Nitrogen Environment

1. Place samples in the oven chamber then close the oven door.
2. Close the purge/vent control valve, switch Nitrogen/Air selection valve to Nitrogen.
3. Open the vacuum control valve to remove any air remaining in the chamber.
4. Close the vacuum control valve and slowly open the “purge control valve” to bleed as much N₂ as you wish. The pressure inside the oven will rise.
5. Close the purge control valve.
6. Repeat the step 3 to 5 several times.
7. Then follow the 4.6.1 step 2-8.

4.6.3 Operating in a Vacuum Environment

1. Place samples in the oven then close the oven door.
2. Close both the purge control and vacuum control valve.
3. Open the vacuum control valve (fully counter clockwise).
4. The vacuum, in inches of mercury, can be obtained from the vacuum gauge on the bottom of the oven.
5. Then follow the 4.6.1 step 2-8.

4.7 Clean Up

1. Clean the vacuum oven.
2. Make sure the Power Switch at “OFF” position.

4.8 Check Out

1. Check out the equipment via card reader immediately after use.
2. Fill in the details, problems or comments in the log sheet.