

# Operating & Maintenance Instructions

## 200FD Fan Circulated Oven

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## 1. On Delivery

Carefully unpack your new oven and ensure that it has arrived in good condition. Any obvious transit damage must be reported promptly to us and the haulier. Position the oven at a convenient working height, ensuring that there is a 75mm (3") air gap all round for heat dissipation.

## 2. Electrical Supply

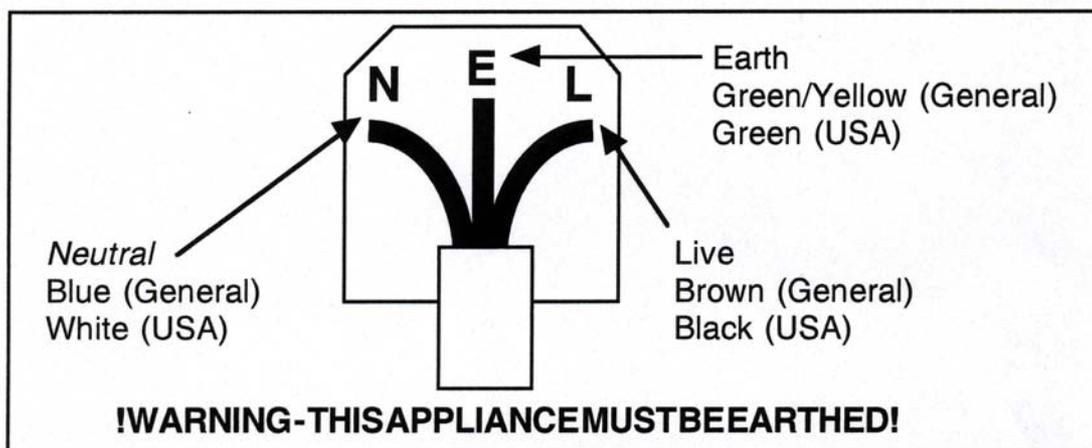
The electrical specification of your new machine is as follows:-

	<b>High Voltage</b>	<b>Low Voltage</b>
Voltage	220-230V	110-115V
Current	8.33A	16.66A
Watts	2000W	2000W
Hz	50-60	50-60W

### !!IMPORTANT!!

The wires in this mains lead are coloured in accordance with the following code:

<b>General</b>	<b>Earth</b>	<b>USA</b>
Green & Yellow	<b>Earth</b>	Green
Blue	<b>Neutral</b>	White
Brown	<b>Live(Hot)</b>	Black



**General**

The green and yellow wire must be connected to the terminal marked with the letter E, or the earth symbol, or coloured green and yellow or green.

The blue wire must be connected to the terminal marked with the letter N, or coloured blue or black.

The brown wire must be connected to the terminal marked with the letter L, or coloured brown or red.

**USA (110-115V)**

The green wire must be connected to the green pin (the largest). The white wire must be connected to the silver pin (marked N). The black wire must be connected to the brass pin (marked L).

**USA (220/230V)**

The white and black wires must be connected to the brass coloured terminals. Polarity is not important.

If the plug top is incompatible, replace it with a suitable alternative using the above guidelines.



**Warning - read instructions before installation and use.**

**If in doubt about electrical supply or connection refer to your supplier or consult a qualified electrician.**

## 3. Oven Operation

### 230V Machines

When the oven is plugged into its mains supply the green "mains available" indicator light will illuminate. Switch on the oven at the mains switch on the control panel (O=off, I=on). this switch incorporates a no-volt release, cutting power to the oven until manually reset in the event of a power failure.

### 115V Machines

Plug the machine into a suitable mains supply. Switch on at the rotary mains switch (O=off, I=on) and the clear neon will illuminate. Switch on the heater at the main circuit breaker.

### Set the temperature as follows:

#### 200

Lift the lower grey cover on the temperature controller and the rotating dial. The set temperature is marked by the arrow at the top of the dial. The controller has three indicating neons, to show the actual oven temperature in relation to the set temperature, the left hand arrow shows that the oven is below temperature, the right hand arrow shows the oven in above temperature, with the central arrow illuminating when the oven is at set temperature. There is also a neon in the top left hand corner of the controller, this illuminates when power is being supplied to the heating element.

#### 200FD

Oven temperature can be adjusted from 0 - 400°C (32 - 750°F). The set temperature can be observed by momentarily pressing the left button marked \* on the controller. To adjust press and hold the button \* and adjust using the ↓ or ↑ buttons. The readout will display actual oven temperature other than when I is pressed when the target or set point will be displayed.

### Heating

Items can be heated by placing them on or hanging them from the two mesh shelves provided. Do not use place items on the mesh heater guard; it is too close to the element to afford uniform heat distribution.

When heating thermoplastic sheets such as acrylic for dome blowing, an aluminium sheet placed on the shelf will ensure that no marks are left on the material by the bars of the shelves.

Leave the oven door closed at all times except when loading and unloading, this ensures maximum safety and oven efficiency. When opening the door while the oven is hot, stand well away to avoid the initial "blast" of hot air rising from the interior.

When running at temperatures above 300°C (572°F), the oven casing around the upper door opening may exceed 60°C (140°F).

**Hazardous materials with a low flash point such as resins, paints, petroleum based adhesives, low temperature alloys producing toxic fumes etc. should not be put in the oven under any circumstances. If in doubt consult material manufacturers.**

***NO ASBESTOS HAS BEEN USED IN THE MANUFACTURE OF THIS OVEN***

## 4. General Observations

When the oven initially warms up, observe the temperature controller display. It is normal for the temperature to "overshoot" due to the residual heat of the element being released into the oven cavity. Allow the temperature to stabilise before loading the oven, particularly if heating, for example, acrylic sheets, where the overshoot may cause blistering of the material.

The Model 200 is a convection oven, and thus relies upon free air flow within the heated cavity to maintain a uniform temperature. For this reason, do not cover the mesh shelves any more than is necessary. The 200 FD maintains a more even cavity temperature due to the circulation fan, enabling fuller shelf loading.

## 5. Machine Maintenance

Your new oven should provide many years of trouble free use. The following points are worth checking from time to time to ensure that the oven is operating at maximum efficiency.

After a period of time, the woven fibre door seal may become compressed. The door hinges and handle mountings have been provided with slotted holes to adjust the compression and thus compensate for this.

Periodically oil the hinges and door catch to ensure continued smooth operation.

## 6. Guidance Note on Dip Coating Powders

Always keep powders dry and free from contamination. Damp powder (most thermoplastics are hygroscopic) will cause the grains to cling together and result in poor fluidisation. Contamination by different colours or powder types will produce a "speckled" effect on the finished component. This effect can, sometimes, be quite attractive even if achieved by accident. As the powder becomes fluid it will rise and occupy approximately 10-20% more volume, tanks should not, therefore, be completely filled.

The following data on two of the common powders in general use may be helpful:-

	LDPE	Nylon
Density (Static)	.40Kg/Litre	.55Kg/Litre
Density (Fluidised)	.325Kg/Litre	.49Kg/Litre
Max. working temperature	60°C	100°C
Coating temperature	300-400°C	280-350°C
Post Heat Temp.(if required)	170°C	165°C
Coating thickness	0.30 – 0.90mm	0.20 – 0.75mm
Typical weight of powder for a 200L tank (360)	$= (\text{Vol} - 20\%) \times \text{Density (static)}$ $= (200 \times 0.80) \times 0.4 \text{ (LDPE)}$ $= 64\text{kg}$	
Typical weight of powder for a 50L tank (300)	$= (\text{Vol} - 20\%) \times \text{Density (static)}$ $= (50 \times 0.80) \times 0.4 \text{ (LDPE)}$ $= 16\text{kg}$	
Typical weight of powder for a 5L tank (150/150R)	$= (\text{Vol} - 20\%) \times \text{Density (static)}$ $= (5 \times 0.80) \times 0.4 \text{ (LDPE)}$ $= 1.6\text{kg}$	

## 7. Dome Blowing

Dome blowing relies upon the elastic nature of a heated thermoplastic sheet stretching it uniformly when air pressure is applied to form an even hemisphere. Because of this, materials which are dominantly elastic when heated are most suitable. The most common materials in this category are cast acrylic and PVC.

The sheet should be heated in an oven well into its elastic range, to give the operator time to transfer the material and form the dome. Typical temperatures are 160°C (320°F) for cast acrylic and 140°C (284°F) for PVC. As a general rule, use material of at least 3mm (1/8") thickness, as thinner material will cool too quickly. Thicker materials can be used successfully as they hold their heat longer and, unlike when vacuum forming, no significant extra air pressure is required to form the extra thickness.

### Dome Blowing Technique

Heat the thermoplastic sheet up to the required temperature. Using heat resistant gloves, transfer the sheet to the dome blowing unit, and clamp down.

Apply air pressure using a vacuum forming machine or other suitable source. When blowing, remember that the air inside the dome will expand as it is warmed by the sheet being blown. When the dome is at the required height, stop the incoming air and leave to cool before unclamping.

If the sheet is overblown, and cannot be released from its clamping ring once cold, put the ring complete with dome back into the oven, upon reaching its elastic state the dome will revert to a flat sheet - this is known as plastic memory. For the same reason, a plastic sheet can be used many times to demonstrate the principle of dome blowing.



