ECONOMY VACUUM OVENS

110 – 120 Volts / 220 – 240 Volts

Installation - Operation Manual

SVAC1E     SVAC2E  /  SVAC1E-2     SVAC2E-2
Pictured on cover left to right:

SVAC1E, SVAC2E
Economy Vacuum Ovens

110 – 120 Voltage — SVAC1E  SVAC2E

220 – 240 Voltage — SVAC1E-2  SVAC2E-2

Part Number (Manual): 4861658

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SHELDON MANUFACTURING INC.

SHEL LAB is a brand of Sheldon Manufacturing, INC.

These units are vacuum ovens intended for professional, industrial or educational use where the preparation or testing of materials is done at an ambient air pressure range of 22.14 – 31.3 inHg (75 – 106 kPa), and no flammable, volatile or combustible materials are being heated.

These models are compliant with the following standards:

CAN/CSA C22.2 No. 61010-1:2012
CAN/CSA C22.2 No. 61010-2:010/R:2009
UL 61010-1:2012
UL 61010A-2-010:2002
EN 61010-1:2010
EN 61010-2-010:2003
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INTRODUCTION

Thank you for purchasing a SHEL LAB oven. We know you have many choices in today’s competitive marketplace when it comes to constant temperature equipment. We appreciate you choosing ours. We stand behind our products and will be here if you need us.

READ THIS MANUAL

Failure to follow the guidelines and instructions in this user manual may create a protection impairment by disabling or interfering with the unit safety features. This can result in injury or death.

Before using the unit, read the manual in its entirety to understand how to install, operate, and maintain the unit in a safe manner. Keep this manual available for use by all operators. Ensure all operators are given appropriate training before the unit begins service.

SAFETY CONSIDERATIONS AND REQUIREMENTS

Follow basic safety precautions, including all national laws, regulations, and local ordinances in your area regarding the use of this unit. If you have any questions about local requirements, please contact the appropriate agencies.

SOPs

Because of the range of potential applications this unit can be used for, the operator or their supervisors must draw up a site-specific standard operating procedure (SOP) covering each application and associated safety guidelines. This SOP must be written and available to all operators in a language they understand.

Intended Applications and Locations

SVAC economy ovens are engineered for constant temperature drying, curing, and baking applications under vacuum in professional, industrial, and educational environments. The ovens are not intended for use at hazardous or household locations.

Power

Your unit and its recommended accessories are designed and tested to meet strict safety requirements.

- The unit is designed to connect to a power source using the specific power cord type shipped with the unit.
- Always plug the unit power cord into a protective earth grounded electrical outlet conforming to national and local electrical codes. If the unit is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Do not bend the power cord excessively, step on it, or place heavy objects on it.
- A damaged cord can be a shock or fire hazard. Never use a power cord if it is damaged or altered in any way.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your unit not explicitly authorized by the manufacturer can be dangerous and will void your warranty.
CONTACTING ASSISTANCE

Phone hours for Sheldon Technical Support are 6 am – 4:30 pm Pacific Coast Time (west coast of the United States, UTC -8), Monday - Friday. Please have the following information ready when calling or emailing Technical Support: the model number and the serial number (see page 13).

EMAIL: support@sheldonmfg.com
PHONE: 1-800-322-4897 extension 4, or (503) 640-3000
FAX: (503) 640-1366

Sheldon Manufacturing, INC.
P.O. Box 627
Cornelius, OR 97113

ENGINEERING IMPROVEMENTS

Sheldon Manufacturing continually improves all of its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit’s operating characteristics or appearance differs from those described in this manual, please contact your SHEL LAB dealer or customer service representative for assistance.
**Vacuum Supply Required**

The oven does not come with a vacuum pump. A pump must be separately purchased for the oven.

Consult a vacuum pump specialist to determine the pump type best suited to your baking application. The correct selection of a vacuum pump is critical for evacuating the chamber to the level required for your vacuum baking applications in a timely manner. The nature of the sample or product being heated should drive the selection of the pump, including the types of chemicals outgassed during the baking process. Common pump types include Chemical Duty PTFE Dry, Standard Duty Dry, Compact Direct-Drive, and specialty pumps for Corrosive gases. Selection of an application-specific pump can improve the overall oven performance and minimize pump maintenance costs.

Use of an oil trap plumbed on the vacuum line between the oven and the pump is strongly recommended. The trap protects the pump from any oils outgassed during your baking procedure. This extends the life of the pump. All maintenance and instructional information should be obtained from the pump manufacturer if not shipped with the pump. Use of clamps to secure vacuum tubing is also recommended.

**Pumping Capacity**

Ensure that the selected vacuum pump is rated to a minimum flow capacity of 5 cubic feet per minute (cfm) greater than the chamber volume.

<table>
<thead>
<tr>
<th>Model</th>
<th>Chamber Capacity</th>
<th>Minimum Pump Capacity</th>
<th>Minimum Pump Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1Es</td>
<td>0.56 CuFt</td>
<td>6 cfm</td>
<td>170 Liters per Minute</td>
</tr>
<tr>
<td>SVAC2Es</td>
<td>1.67 CuFt</td>
<td>7 cfm</td>
<td>198 Liters per Minute</td>
</tr>
</tbody>
</table>

**Minimum Vacuum Draw**

To seal completely, the oven chamber must be under a minimum vacuum draw of:

<table>
<thead>
<tr>
<th>inHg</th>
<th>mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>76</td>
</tr>
</tbody>
</table>
**GASKETS**

Gaskets are non-warranty, high-wear consumable items subject to compression forces, heat, and outgassed byproducts. Heavy usage rates may necessitate frequent replacements. The manufacturer strongly recommends keeping a spare gasket on hand during operation.

Each oven comes with a replaceable silicon gasket installed on the chamber liner. This gasket seals against the chamber door to maintain the vacuum integrity of the chamber. The gasket must be replaced periodically and is rated to 230°C. It is vulnerable to acids and solvents. The manufacturer also offers for sale Viton®, fluorosilicone, and Buna gaskets. See page 44 for information on gasket type suitability for baking applications.
RECEIVING YOUR UNIT

**INSPECT THE SHIPMENT**

- When a unit leaves the factory, safe delivery becomes the responsibility of the carrier.
- **Damage sustained during transit is not covered by the manufacturing defect warranty.**
- Save the shipping carton until you are certain that the unit and its accessories function properly.

When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit, **follow the carrier’s procedure for claiming damage or loss.**

1. Carefully inspect the shipping carton for damage.
2. Report any damage to the carrier service that delivered the unit.
3. If the carton is not damaged, open the carton and remove the contents.
4. The unit should come with an Installation and Operation Manual.
5. Verify that the correct number of accessories has been included.
6. Carefully check all packaging for loose accessories before discarding.

**Included Accessories:**

- **SVAC1Es**
  - 2 Shelves
- **SVAC2Es**
  - 2 Shelves
RECEIVING YOUR UNIT

**Orientation Photos**

Figure 1: SVAC1Es
Figure 2: SVAC2Es
Figure 3: Unit Back

- Chamber Vent Port
  ¼ inch (6.35 mm)
- Vacuum Port
  3/8 inch (9.52 mm)
- Power Cord Inlet
- Fuse Holders
  (One holder only in 110-120 Voltage units)
**RECORD DATA PLATE INFORMATION**

The data plate contains the unit **model number** and **serial number**. Tech Support will need this information during any support call. Record it below for future reference.

- The data plate is located on the back of the oven above the power inlet.

<table>
<thead>
<tr>
<th>Model Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td></td>
</tr>
</tbody>
</table>
**Installation Procedure Checklist**

Carry out the procedures and steps listed below to install the oven in a new workspace location and prepare it for use. All procedures are found in the Installation section of this manual.

**Pre-Installation**

- Verify a vacuum supply source suitable for your application is available and can be connected to the oven.
  - See page 21 for the oven gas and vacuum port locations.
- Check that the required ambient conditions for the unit are met, page 16.
- Check that the spacing clearance requirements are met, page 16.
  - Unit dimensions may be found on page 39.
- Check that a suitable electrical outlet and power supply is present, page 17.

**Installing the oven in a suitable workspace location**

- Review the lifting and handling instructions, page 18.
- Install the oven in its workspace location, page 19.
- Make sure the oven is level, page 18.

**Set up the oven for use**

- Clean the oven shelving. Clean the chamber if needed, page 19.
- Install the shelving in the oven chamber, page 20.
- Connect the oven to its vacuum supply source, page 21.
- **Optional:** Connect the oven to an inert backfill gas. See page 21.
INSTALLATION

REQUIRED AMBIENT CONDITIONS
When selecting a location to install the unit, consider all environmental conditions that can adversely impact its temperature performance. These include:

- Proximity to other ovens, autoclaves, and any device that produces significant radiant heat
- Heating and cooling vents or other sources of fast-moving air currents
- High-traffic areas
- Direct sunlight

This oven is intended for use indoors, at room temperatures between 15°C and 40°C (59°F and 104°F), at no greater than 80% Relative Humidity (at 25°C / 77°F). Operating these units outside of these conditions may adversely affect temperature stability and effective operating range.

REQUIRED CLEARANCES
These clearances are required to provide air flows for ventilation and cooling.

12 inches (305 mm) of clearance is required on the sides and back.

12 inches (305 mm) of headspace clearance between the top of the unit and any overhead partitions.

Do not place objects on top of the oven.
POWER SOURCE REQUIREMENTS

When selecting a location for the unit, verify each of the following requirements is satisfied.

**Power Source**: The wall power outlet must meet the power requirements listed on the unit data plate.

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Voltage</th>
<th>Amperage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>110 – 120</td>
<td>5.0</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>110 – 120</td>
<td>10.0</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>220 – 240</td>
<td>2.5</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>220 – 240</td>
<td>5.5</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

- Wall power sources must be protective earth grounded and **single phase**.
- Wall power sources must conform to all national and local electrical codes.
- **Supplied voltage must not vary more than 10% from the data plate rating**. Damage to the unit may result if the supplied voltage varies more than 10%.
- The recommended wall circuit breakers for 110 – 120 VAC units are 15 amps.
- The recommended wall circuit breakers for 220 – 240 VAC units are 16 amps.
- Use a separate circuit to prevent loss of product due to overloading or circuit failure. The circuit must match or exceed the amperage requirement listed on the unit data plate.

**Power Cord**: The unit must be positioned so that all end-users can quickly unplug the oven in the event of an emergency.

- SVAC1E and SVAC2E units come provided with a 125 volt, 15 amp, 8ft 2 in (2.5m) NEMA 5-15P integrated power cord.
- SVAC1E-2 and SVAC2E-2 units come provided with a 250 volt, 16 amp 8ft 2 in (2.5m) CEE 16P integrated power cord.
- Always use this cord or an identical replacement.

**Fuses**: SVAC1Es and SVAC2Es each ship with a fuse installed in a fuse holder next to the power cord inlet. SVAC1E-2s and SVAC2E-2s each ship with 2 fuses installed in holders next to the cord inlet.

- Fuses must be installed and intact for the unit to operate.
- Always find and fix the cause of a blown fuse prior to putting the unit back into operation.
- Fuse types:
  - SVAC1Es: 250V, T6.3, 5X20mm
  - SVAC2Es: 250 V, T10A 5X20mm
LIFTING AND HANDLING
The oven is heavy. Use appropriate lifting devices that are sufficiently rated for these loads. Follow these guidelines when lifting the oven:

- Lift the oven only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the oven completely while lifting or transporting so it cannot tip.
- Remove all moving parts, such as shelves and trays, and lock doors in the closed position during transfers to prevent shifting and damage.

LEVELING
The oven is equipped with rubber feet to raise it off the counter and prevent sliding. Ensure that the oven is on a flat and level surface, prior to placing the unit in operation.
**INSTALL THE OVEN**

Place the unit in a workspace location that meets the criteria discussed in the previous entries of the Installation section.

**DEIONIZED AND DISTILLED WATER**

Do not use deionized water to clean the unit. Use of deionized water may corrode metal surfaces and voids the warranty. The manufacturer recommends the use of distilled water in the resistance range of 50K Ohm/cm to 1M Ohm/cm, or a conductivity range of 20.0 uS/cm to 1.0 uS/cm, for cleaning.

**INSTALLATION - CLEAN AND DISINFECT**

Cleaning and disinfecting the unit chamber and shelving components now reduces the risk of contamination. The chamber and shelving were cleaned and disinfected at the factory, however, the unit may have been exposed to contaminants during shipping.

- Remove all protective wrappings from shelving components prior to cleaning.
- See the Cleaning and Disinfecting entry on page 37 for information on how to clean and disinfect without damaging the unit or its components.
**SHELVING INSTALLATION**

SVAC economy ovens are provided with 2 identical stacking shelves. Install both shelves.

Never place samples or product on the oven chamber floor. The floor runs hotter than the shelf temperatures. All heating specifications for the oven are for shelving temperatures.

1. Carefully slide one shelf into position on the chamber floor.

2. Place the second shelf on top of it.
**CONNECT TO THE VACUUM SUPPLY**

- **The Vacuum Port – 3/8 Inch (9.52 mm) OD**
  - Connect a vacuum supply capable of supplying up to -29 inches of mercury (inHg) of vacuum to this port. Chamber atmosphere is evacuated through this port.
  - This port is opened and closed by the Vacuum Valve control on the front control panel.

- **The Chamber Vent Port (Backfill Inlet) – 1/4 Inch (6.35 mm) OD**
  - This intake port allows external atmosphere to backfill the oven chamber when the chamber Vent Valve control on the front control panel is set to open.
  - Optional: An inert backfill gas supply source may be connected to this port. **The maximum allowed pressure for a backfilling gas is 15 psi measured at the inlet port.**

Use clamps to secure tubing to the Vacuum Port and Chamber Vent Port (backfill inlet).
The unit is provided with multiple graphic symbols on its exterior. The symbols identify hazards and the functions of the adjustable components, as well as important notes in the user manual.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
</table>
| ! | Consult the user manual  
Consulter le manuel d'utilisation |
| °C | Temperature display  
Indique l'affichage de la température |
| ! | Potential shock hazard  
Risque de choc électrique |
| | AC Power  
Repère le courant alternatif |
| I/ON  O/OFF | I indique que l'interrupteur est en position marche.  
O indique que le commutateur est en position d'arrêt. |
| | Protective earth ground  
Terre électrique |
| | Manually adjustable  
Indique un réglage manuel |
| | Recycle the unit. Do not dispose of in a landfill.  
Recycler l'unité. Ne jetez pas dans une décharge. |
| | Caution hot surface  
Attention surface chaude |
| | Indicates the oven is heating  
Le four chauffe |
CONTROL OVERVIEW

Figure 6: Control Panel

Power Switch

Power is supplied to the unit when the switch is in the (1) ON position.

Temperature Control Dial

This graduated dial sets the oven operating temperature. The dial is marked with 10 major increments and 9 minor increments, which can be used as index points for setting and returning to temperature levels.

Heating Activated Light

The green light located above the label HEATING ACTIVATED and illuminates whenever the oven elements are being powered to heat the chamber.
CONTROL OVERVIEW

Vacuum Gauge
This gauge indicates the level of vacuum within the chamber. The dial displays a vacuum pressure range of 0 – 76 cmHg and 0 – 30 inHg, with 30 inHg. Zero indicates ambient atmospheric pressure and 30 indicates a perfect vacuum level.

Vacuum Control Valve
This valve adjusts the level of vacuum draw applied to the oven chamber through the 3/8in Vacuum Port on the back of the oven.

- When open, this valve allows a connected vacuum supply to evacuate the oven chamber.
- In the closed position, the valve closes off the vacuum draw.

Vent Control Valve
This valve controls the oven chamber Vent Port (backfill inlet) on the back of the oven.

- In the open position, the oven chamber is open to external atmosphere through the Vent Port.
  - Optional: An inert or clean backfilling gas supply connected to the Vent Port will flow gas from the pressurized supply to the oven chamber when the Vent Valve is open.
- When the valve control is in the closed position, the chamber is cut off from external atmosphere and any backfill gas supply.
  - The vent valve must be closed before evacuating the chamber. Failure to do so may result in damage to the vacuum pump.
Safe operation of the oven is dependent on the actions and behavior of the oven operators. Operating personnel must read and understand the Operating Precautions in this section prior to operating the oven. The operators must follow these instructions to prevent injuries and to safeguard their health, environment, and the materials being treated in the oven, as well as to prevent damage to the oven. Failure to adhere to the Operating Precautions, deliberately or through error, is a hazardous behavior on the part of the operator.

Le fonctionnement sûr du four dépend des actions et du comportement des opérateurs du four. Le personnel d’exploitation doit lire et comprendre les consignes de sécurité et les précautions d’utilisation de cette section avant d’utiliser le four. Les opérateurs doivent suivre ces instructions pour prévenir les blessures et protéger leur santé, leur environnement et les matériaux traités dans le four, ainsi que pour éviter d’endommager le four. Le non-respect des consignes de sécurité et des précautions d’utilisation, délibérément ou par erreur, est un comportement dangereux de la part de l’opérateur.

**OPERATING PRECAUTIONS**

- Do not use this oven in unsafe improper applications that produce flammable or combustible gases, vapors, liquids, or fuel-air mixtures in quantities that can become potentially explosive.

- Outgassed byproducts may be hazardous to or noxious for operating personnel. Vacuum pump exhaust should be vented to a location outside the workspace in a safe manner in accordance with all applicable laws, ordinances, and regulations. Do not operate the oven in an unsafe area with noxious fumes.

- Do not use this oven for applications heating hazardous fibers or dust. These items can become airborne and come into contact with hot surfaces.

- Individual ovens are not rated to be explosion proof. Follow all building certification requirements and laws for Class I, II, or III locations as defined by the US National Electric Code.

- The bottom surface of the chamber should not be used as a work surface. It runs hotter than the shelf temperatures. Never place samples or product on the oven chamber floor.

- Do not place sealed or filled containers in the oven. These may burst open when the chamber is under vacuum.

- Do not place alcohol or mercury thermometers in the oven. With improper use, they can rupture.

- Do not move the oven until it has finished cooling.

---

**Warning Hot Surfaces:** These areas are marked with Hot Surface labels. Proper protective equipment should be employed to minimize the risk of burns.

**Avertissement Surface Chaude:** Ces zones sont marquées avec des étiquettes de surface chaude. Un équipement de protection approprié devrait être utilisé pour minimiser le risque de brûlures.
**THEORY OF OPERATION**

These units are intended for use in closed-cycle, under-vacuum applications.

Vacuum

The oven chamber is evacuated by a vacuum pump or building system. The vacuum supply is connected to the Vacuum Port on the back of the oven. The current level of relative vacuum is displayed on the Vacuum Gauge on the main control panel.

The oven chamber is pressure rated to -0.09 inHg gauge pressure at near sea level. Vacuum levels obtained in the oven chamber are dependent on pump performance, valve settings, and the nature of the application or process, including the volume of material outgassed. The maximum attainable vacuum is governed by altitude above sea level (see page 36 for more information).

The chamber must be sealed off from the room atmosphere prior to the start of a vacuum baking application. The oven is not built to operate with the chamber exposed to free atmosphere or to circulate air within the chamber. Running the oven with the door or the vent control valve open risks destroying the vacuum pump and damaging the integrity of the oven chamber.

Vacuum pumps and door gaskets should be selected on the basis of the application or process. Some gaskets are vulnerable to different chemicals, and vacuum pumps vary in suitability and safety depending on the outgassed byproduct types and moisture level produced in the oven chamber.

Gas Backfill

An inert gas supply, such as gas nitrogen (GN₂) can be connected to the vent intake port located on the back of the oven. The gas is used to backfill an evacuated oven chamber in order to avoid particulate contamination or oxidation. The maximum allowed backfill pressure is 15 psi of delivery at the oven vent port.
**OPERATION**

**Heating in a Vacuum**

In conventional ovens, a powered element transfers heat into the chamber air. The heated air then circulates by natural convection or blower fan action, and surrounds the product on the shelves, gradually bringing it to temperature. In a vacuum oven, there is no atmosphere to transport heat evenly from the elements to the product. Instead, heat transport takes place primarily by conduction. The oven heating elements are located inside the chamber walls, which in turn transfer heat to the shelves. Each shelf then transports heat to the products or samples resting on it.

Direct radiant heating through infrared emission in a vacuum environment provides poor temperature uniformity compared to conductive heating.

SVAC economy ovens rely on natural heat radiation for cooling. The oven can achieve a low-end operating temperature of the ambient room temperature plus the oven waste heat.

Allowing the oven to heat up with atmosphere in the chamber can result in a significant heat spike when the chamber is brought under vacuum.
**OPERATION**

**Note:** You may place a dial thermometer in the oven chamber prior to turning on the oven if you will be setting the oven to a specific temperature. See page 34 for thermometer requirements.

**PUT THE OVEN INTO OPERATION**

Verify all the required procedures in the Installation section have been carried out. Then perform the following steps and procedures to prepare the oven for use in a new location.

1. **Plug in the Oven**

2. **Verify the Oven Valves are Set to Closed**

   Check that oven chamber door is closed and latched, and that the vent and vacuum valves are both in the closed position.

   Always verify the oven chamber is sealed prior to starting the oven to help safeguard your vacuum pump from prolonged exposure to streaming atmosphere.

3. **Turn on the Oven**

   Place the oven **Power Switch** in the ON (I) position.

4. **Turn on the Vacuum Pump**

5. **Verify the vacuum system integrity**

   **Evacuate the Oven Chamber** for 10 minutes to verify the integrity of the vacuum supply system. See page 32.

   Minimum 10 Minutes

Continued next page
Continued from the previous page

6. Set the Oven Chamber to an Approximate Temperature

See the Select Approximate Oven Temperature procedure on page 33.

Optional: Temperature Matching

Set the oven to a specific temperature using a reference thermometer.

- See the Temperature Matching procedure on page 34.

The oven is now ready for use
OPERATION

EVACUATING THE OVEN CHAMBER

Put the oven chamber under vacuum for at least 10 minutes when first putting the oven into operation in a new location to verify the integrity of the vacuum supply system.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Verify the Vent Valve control is in the closed position (all the way clockwise).</td>
</tr>
<tr>
<td>2</td>
<td>Verify the Vacuum Valve control is in the closed position (all the way clockwise).</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Always make sure the Vacuum and Vent valves are closed prior to applying vacuum to the chamber.</td>
</tr>
<tr>
<td>3</td>
<td>Turn on the pump if it is not already on.</td>
</tr>
<tr>
<td>4</td>
<td>Open the oven Vacuum Valve, turning it all the way counterclockwise to bring oven chamber under vacuum draw.</td>
</tr>
<tr>
<td></td>
<td>- The Vacuum Gauge needle on the front panel should begin rotating counterclockwise as the chamber evacuates.</td>
</tr>
<tr>
<td>5</td>
<td>Keep the oven chamber under vacuum throughout the duration of your baking application to help evacuate outgassed byproducts.</td>
</tr>
<tr>
<td></td>
<td>The achievable vacuum level in the oven chamber is dependent on altitude above sea level as well as the vacuum pump flow rate and the volume of outgassed byproducts.</td>
</tr>
<tr>
<td>6</td>
<td>Turn the Vacuum Valve control back to the closed position (clockwise) to protect the vacuum pump from exposure to streaming atmosphere.</td>
</tr>
<tr>
<td></td>
<td>- The pump may remain on.</td>
</tr>
<tr>
<td>8</td>
<td>Slowly turn the Vent Valve control to the Open position to backfill the oven chamber with atmosphere or gas.</td>
</tr>
</tbody>
</table>

End of procedure
SELECT APPROXIMATE OVEN TEMPERATURE

1. Set the Approximate Oven Temperature

Turn the Temperature controller knob to the approximate position for your application, using the graduated dial as a reference guide.

<table>
<thead>
<tr>
<th>Controller Position</th>
<th>Approximate Temperature</th>
<th>Controller Position</th>
<th>Approximate Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Low Temp" /></td>
<td>30 – 48°C*</td>
<td><img src="image" alt="Med Temp" /></td>
<td>125 – 143°C</td>
</tr>
<tr>
<td><img src="image" alt="Med Temp" /></td>
<td>49 – 67°C</td>
<td><img src="image" alt="High Temp" /></td>
<td>144 – 162°C</td>
</tr>
<tr>
<td><img src="image" alt="High Temp" /></td>
<td>68 – 86°C</td>
<td><img src="image" alt="Low Temp" /></td>
<td>163 – 181°C</td>
</tr>
<tr>
<td><img src="image" alt="Low Temp" /></td>
<td>87 – 105°C</td>
<td><img src="image" alt="High Temp" /></td>
<td>182 – 200°C</td>
</tr>
<tr>
<td><img src="image" alt="High Temp" /></td>
<td>106 – 124°C</td>
<td><img src="image" alt="Low Temp" /></td>
<td>200 – 210°C*</td>
</tr>
</tbody>
</table>

*The achievable low- and high-end operating temperatures are partly dependent on the ambient room temperature.
**TEMPERATURE MATCHING**

This procedure sets the oven to a specific temperature using a reference thermometer.

**Required Thermometer Type:** A dial style bimetallic thermometer. Do not use an alcohol or mercury thermometer. These can rupture under vacuum.

1. Place the thermometer on the top shelf of the oven where the face will be visible through the glass door.
   - Make sure the temperature sensing probe is in maximum surface area contact with the middle of the shelf.
   - **No alcohol or mercury thermometers.**

2. Evacuate the oven chamber, see page 32.

3. Set the approximate oven temperature, see page 33.
Temperature Matching (continued)

4. Wait 45 minutes for the chamber temperature to stabilize
   - The chamber must be evacuated to accurately match the dial setting to a specific temperature.

5. Check the thermometer temperature
   - If the thermometer temperature matches your application temperature or is close enough, the temperature matching procedure is now complete.
     Record the controller dial position.

   -OR-

   - See the next step if the difference falls outside the acceptable range of your application.

6. Adjust the temperature dial
   - Adjust the dial up or down and wait 20 minutes before re-checking reference thermometer.
   - If the oven fails to achieve your application temperature in 5 attempts, contact Technical Support.

End of Procedure
**Maximum Obtainable Vacuum**

The maximum vacuum obtainable is set by the altitude of the oven workspace or laboratory environment. The atmosphere is less dense at higher altitudes than at sea level. While a vacuum pump will evacuate the same percentage of atmosphere from the oven chamber, less overall pressure is expelled because of the reduced density.

<table>
<thead>
<tr>
<th>Altitude (Feet)</th>
<th>Altitude (Meters)</th>
<th>Atmospheric Pressure</th>
<th>Maximum Vacuum Level Attainable *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level</td>
<td>Sea Level</td>
<td>14.70 psi</td>
<td>-29.9 inHg</td>
</tr>
<tr>
<td>1000ft</td>
<td>305m</td>
<td>14.16 psi</td>
<td>-28.9 inHg</td>
</tr>
<tr>
<td>2000ft</td>
<td>610m</td>
<td>13.66 psi</td>
<td>-27.8 inHg</td>
</tr>
<tr>
<td>3000ft</td>
<td>914m</td>
<td>13.16 psi</td>
<td>-26.8 inHg</td>
</tr>
<tr>
<td>4000ft</td>
<td>1219m</td>
<td>12.68 psi</td>
<td>-25.8 inHg</td>
</tr>
<tr>
<td>5000ft</td>
<td>1524m</td>
<td>12.22 psi</td>
<td>-24.9 inHg</td>
</tr>
<tr>
<td>6000ft</td>
<td>1829m</td>
<td>11.77 psi</td>
<td>-24.0 inHg</td>
</tr>
<tr>
<td>7000ft</td>
<td>2134m</td>
<td>11.33 psi</td>
<td>-23.1 inHg</td>
</tr>
<tr>
<td>8000ft</td>
<td>2438m</td>
<td>10.91 psi</td>
<td>-22.2 inHg</td>
</tr>
<tr>
<td>9000ft</td>
<td>2743m</td>
<td>10.50 psi</td>
<td>-21.4 inHg</td>
</tr>
<tr>
<td>10,000ft</td>
<td>3048m</td>
<td>10.10 psi</td>
<td>-20.6 inHg</td>
</tr>
</tbody>
</table>

*In gauge pressure

**Pressure Units Conversion Chart**

<table>
<thead>
<tr>
<th>Unit</th>
<th>1 inHg</th>
<th>1 kPa</th>
<th>1 Kgf/cm²</th>
<th>1 bar</th>
<th>1 psi</th>
<th>1 mmHG</th>
<th>1 mmH₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inHg</td>
<td>1</td>
<td>3.3863</td>
<td>0.0345</td>
<td>0.3386</td>
<td>0.4911</td>
<td>25.400</td>
<td>345.32</td>
</tr>
<tr>
<td>1 kPa</td>
<td>0.2953</td>
<td>1</td>
<td>0.0102</td>
<td>0.01</td>
<td>0.1450</td>
<td>7.5006</td>
<td>101.97</td>
</tr>
<tr>
<td>1 Kgf/cm²</td>
<td>28.9590</td>
<td>98.0665</td>
<td>1</td>
<td>0.9806</td>
<td>14.2233</td>
<td>735.55</td>
<td>10000.27</td>
</tr>
<tr>
<td>1 bar</td>
<td>29.5300</td>
<td>100</td>
<td>1.0197</td>
<td>1</td>
<td>14.5037</td>
<td>750.06</td>
<td>10197.44</td>
</tr>
<tr>
<td>1 psi</td>
<td>2.0360</td>
<td>6.8947</td>
<td>0.0703</td>
<td>0.0689</td>
<td>1</td>
<td>51.7150</td>
<td>703.09</td>
</tr>
<tr>
<td>1 mmHG</td>
<td>0.0394</td>
<td>1.3332</td>
<td>0.0014</td>
<td>0.0013</td>
<td>0.0193</td>
<td>1</td>
<td>13.5954</td>
</tr>
<tr>
<td>1 mmH₂O</td>
<td>0.0028</td>
<td>0.0098</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0014</td>
<td>0.0029</td>
<td>1</td>
</tr>
</tbody>
</table>
USER MAINTENANCE

Warning: Disconnect the unit from its power supply prior to maintenance or cleaning of this unit.

Avertissement: Avant d’effectuer toute maintenance ou entretien de cet appareil, débrancher le cordon secteur de la source d’alimentation.

CLEANING AND DISINFECTING

If a hazardous material or substance has spilled in the unit, immediately initiate your site Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the site policy and procedures.

- Periodic cleaning is required.
- Do not use spray on cleaners or disinfectants. These can leak through openings and coat electrical components.
- Do not use cleaners or disinfectants that contain solvents capable of harming paint coatings or stainless steel surfaces. Do not use chlorine-based bleaches or abrasives; these will damage the chamber liner.
- Consult with the manufacturer or their agent if you have any doubts about the compatibility of decontamination or cleaning agents with the parts of the equipment or with material contained in it.

Warning: Exercise caution if cleaning the unit with alcohol or flammable cleaners. Always allow the unit to cool down to room temperature prior to cleaning and make sure all cleaning agents have evaporated or otherwise been completely removed prior to putting the unit back into service.

Avertissement: Soyez prudent lorsque vous nettoyez l’appareil avec de l'alcool ou des produits de nettoyage inflammables. Laissez toujours refroidir l'appareil à la température ambiante avant le nettoyage et assurez-vous que tous les produits de nettoyage se sont évaporés ou ont été complètement enlevés avant de remettre l’appareil en service.

Cleaning

1. Remove all removable chamber accessory items (shelves, racks, and any additional items), if present.
2. Clean the chamber interior with a mild soap and water solution, including all corners.
3. Clean all removable accessories and components.
4. Rinse the chamber surfaces and shelving with distilled water and wipe dry with a soft cloth. Do not use deionized water.
   - Deionized water is an aggressive solvent that will attack most metals. Never use deionized water to clean your oven, even if it is readily available in your laboratory or production workspace.
**USER MAINTENANCE**

**Disinfecting**
Disinfect the oven if algae, mold, bacteria, or other biological contaminants are an issue. For maximum effectiveness, disinfection procedures are typically performed after cleaning. Keep the following points in mind:

- Turn off and unplug the unit to safeguard against electrical hazards.
- Disinfect the oven chamber using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel and glass surfaces. Contact your local Site Safety Officer for detailed information on which disinfectants are compatible with your applications.
- If permitted by your protocol, remove all interior accessories (any shelving and other non-attached items) from the chamber when disinfecting.
- Disinfect all surfaces in the chamber, making sure to thoroughly disinfect the corners.
- When disinfecting external surfaces, use disinfectants that will not damage painted metal, glass, and plastic.

**MAINTAINING ATMOSPHERIC INTEGRITY**
Periodically, inspect the door latch, trim, catch, and gasket for signs of deterioration. Failure to maintain the integrity of the door system shortens the lifespan of the unit.

The gasket should be replaced if it is dry, cracked, or otherwise showing a loss of elasticity.

**ELECTRICAL COMPONENTS**
Electrical components do not require maintenance. If the oven fails to operate as specified, please contact your distributor or Technical Support for assistance.

**VACUUM PUMP MAINTENANCE**
Refer to the operation manual supplied with your vacuum pump for recommended maintenance routines, such as oil levels, replacement of sorbent charge, and exhaust filter change outs. **Contact your vacuum pump supplier if you do not have an operation manual.**

**STORAGE**
To prepare the unit for storage, remove all shelves, dry the chamber completely, and disconnect the power supply. Be certain that the door is positively locked in the closed position.
SVAC1E and SVAC2E units are 110-120 VAC. SVAC1E-2 and SVAC2E-2 units are 220-240 VAC. Please refer to the oven data plate for individual electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and at nominal voltage. The temperatures specified are determined in accordance to factory standard following DIN 12880 respecting the recommended wall clearances of 10% of the height, width, and depth of the inner chamber. All indications are average values, typical for units produced in the series. We reserve the right to alter technical specifications at all times.

**Weight**

<table>
<thead>
<tr>
<th>Model</th>
<th>Shipping Weight</th>
<th>Unit Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>93 lbs / 43 kg</td>
<td>59.4 lbs / 27.0 kg</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>154 lbs / 70 kg</td>
<td>108.0 lbs / 49.0 kg</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>93 lbs / 43 kg</td>
<td>59.4 lbs / 49.0 kg</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>154 lbs / 70 kg</td>
<td>108.0 lbs / 49.0 kg</td>
</tr>
</tbody>
</table>

**Dimensions**

**Inches**

<table>
<thead>
<tr>
<th>Model</th>
<th>Exterior W × D × H</th>
<th>Interior W × D × H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>15.5 x 19.0 x 22.5 in</td>
<td>9.0 x 12.0 x 9.0 in</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>18.5 x 27.8 x 25.3 in</td>
<td>12.0 x 20.0 x 12.0 in</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>15.5 x 19.0 x 22.5 in</td>
<td>9.0 x 12.0 x 9.0 in</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>18.5 x 27.8 x 25.3 in</td>
<td>12.0 x 20.0 x 12.0 in</td>
</tr>
</tbody>
</table>

**Millimeters**

<table>
<thead>
<tr>
<th>Model</th>
<th>Exterior W × D × H</th>
<th>Interior W × D × H</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>394 x 483 x 572 mm</td>
<td>228 x 304 x 228 mm</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>470 x 705 x 641 mm</td>
<td>304 x 508 x 304 mm</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>394 x 483 x 572 mm</td>
<td>228 x 304 x 228 mm</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>470 x 705 x 641 mm</td>
<td>304 x 508 x 304 mm</td>
</tr>
</tbody>
</table>
## Unit Specifications

### Capacity

<table>
<thead>
<tr>
<th>Model</th>
<th>Cubic Feet</th>
<th>Liters</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>0.56</td>
<td>15.9</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>1.67</td>
<td>47.2</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>0.56</td>
<td>15.9</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>1.67</td>
<td>47.2</td>
</tr>
</tbody>
</table>

### Shelf Capacity by Weight

<table>
<thead>
<tr>
<th>Model</th>
<th>Per Shelf</th>
<th>Max Total Load</th>
<th>Max No. Shelves</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>35.0 lbs / 15.8 kg*</td>
<td>70.0 lbs / 31.7 kg**</td>
<td>2</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>35.0 lbs / 15.8 kg*</td>
<td>70.0 lbs / 68.0 kg***</td>
<td>2</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>35.0 lbs / 15.8 kg*</td>
<td>70.0 lbs / 31.7 kg**</td>
<td>2</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>35.0 lbs / 15.8 kg*</td>
<td>70.0 lbs / 68.0 kg***</td>
<td>2</td>
</tr>
</tbody>
</table>

*35 lbs / 15.8 kg with weight evenly distributed across the shelf.

**70 lbs / 31.7 kg total load for the SVAC1Es. Exceeding this limit risks damaging the chamber liner.

***70 lbs / 68 kg total load for the SVAC2Es. Exceeding this limit risks damaging the chamber liner.

### Vacuum

#### Operational Vacuum Range

<table>
<thead>
<tr>
<th>inHg</th>
<th>cmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 - 29.9</td>
<td>0 - 76</td>
</tr>
</tbody>
</table>

#### Vacuum Gauge Range

<table>
<thead>
<tr>
<th>inHg</th>
<th>cmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 30.0</td>
<td>0.0 - 76.0</td>
</tr>
</tbody>
</table>
UNIT SPECIFICATIONS

TEMPERATURE

Range, Stability, and Uniformity

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
<th>Stability</th>
<th>Uniformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>Ambient +15° to 210°C</td>
<td>±0.5°C @ 100°C</td>
<td>±9.0</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>Ambient +15° to 210°C</td>
<td>±0.5°C @ 100°C</td>
<td>±9.0</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>Ambient +15° to 210°C</td>
<td>±0.5°C @ 100°C</td>
<td>±9.0</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>Ambient +15° to 210°C</td>
<td>±0.5°C @ 100°C</td>
<td>±9.0</td>
</tr>
</tbody>
</table>

Time to Temperature: From an ambient temperature of +20°C.

<table>
<thead>
<tr>
<th>Model</th>
<th>Heat up to 80°C</th>
<th>Heat up to 150°C</th>
<th>Heat up to 210°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>30 Minutes</td>
<td>45 Minutes</td>
<td>120 Minutes</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>30 Minutes</td>
<td>45 Minutes</td>
<td>120 Minutes</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>30 Minutes</td>
<td>45 Minutes</td>
<td>120 Minutes</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>30 Minutes</td>
<td>45 Minutes</td>
<td>120 Minutes</td>
</tr>
</tbody>
</table>

POWER

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Voltage</th>
<th>Amperage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVAC1E</td>
<td>115</td>
<td>5.0</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC2E</td>
<td>115</td>
<td>10.0</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC1E-2</td>
<td>230</td>
<td>2.5</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>SVAC2E-2</td>
<td>230</td>
<td>5.5</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>
See next page for gaskets.

<table>
<thead>
<tr>
<th>Description</th>
<th>Parts Number</th>
<th>Description</th>
<th>Parts Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelf, SVAC2Es</td>
<td>5680567</td>
<td>Shelf, SVAC1Es</td>
<td>5680566</td>
</tr>
</tbody>
</table>

**Ordering Parts and Consumables**

If you have the Part Number for an item, you may order it directly from Sheldon Manufacturing by calling 1-800-322-4897 extension 3. If you are not certain that you have the correct Part Number, or if you need that specific item, please contact Sheldon Technical Support for help at 1-800-322-4897 extension 4 or (503) 640-3000. Please have the **model** and **serial number** of the oven ready, as Tech Support will need this information to match your unit to its correct part.
REPLACEMENT GASKETS

<table>
<thead>
<tr>
<th>Available Gasket Types</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon, black or red, (comes with oven), rated to 230°C</td>
<td>SVAC1Es: 3450706, SVAC2Es: 3450707</td>
</tr>
<tr>
<td>Applications: General and high temperature</td>
<td></td>
</tr>
<tr>
<td>Resistant to: Moderate or oxidizing chemicals, ozone, and concentrated sodium hydroxide</td>
<td></td>
</tr>
<tr>
<td>Attacked by: Many solvents, oils, concentrated acids, and diluted sodium hydroxide</td>
<td></td>
</tr>
<tr>
<td>Buna rated to 105°C</td>
<td>SVAC1Es: 3450712, SVAC2Es: 3450708</td>
</tr>
<tr>
<td>Applications: Solvent</td>
<td></td>
</tr>
<tr>
<td>Resistant to: Many hydrocarbons, fats, oils, greases, and hydraulic fluids.</td>
<td></td>
</tr>
<tr>
<td>Attacked by: Ozone (except PVC blends), ketones, esters, aldehydes, chlorinated, and nitro hydrocarbons.</td>
<td></td>
</tr>
<tr>
<td>Fluorosilicone rated to 175°C</td>
<td>SVAC1Es: 3450610, SVAC2Es: 3450611</td>
</tr>
<tr>
<td>Applications: Acidic</td>
<td></td>
</tr>
<tr>
<td>Resistant to: Moderate or oxidizing chemicals, ozone, aromatic chlorinated solvents, and bases.</td>
<td></td>
</tr>
<tr>
<td>Attacked by: Brake fluids, hydrazine, and ketones.</td>
<td></td>
</tr>
<tr>
<td>Viton® rated to 205°C</td>
<td>SVAC1Es: 3450669, SVAC2Es: 3450670</td>
</tr>
<tr>
<td>Applications: Acidic</td>
<td></td>
</tr>
<tr>
<td>Resistant to: All aliphatic, aromatic and halogenated hydrocarbons, acids, and animal and vegetable oils.</td>
<td></td>
</tr>
<tr>
<td>Attacked by: Ketones, low molecular weight esters, and compounds containing nitro.</td>
<td></td>
</tr>
<tr>
<td>Gasket Dimensions</td>
<td></td>
</tr>
<tr>
<td>SVAC1Es – 9.2 X 9.3 Inches (229 x 229 mm)</td>
<td></td>
</tr>
<tr>
<td>SVAC2Es – 12 x 12 Inches (305 x 304 mm)</td>
<td></td>
</tr>
</tbody>
</table>