

# Installation and Operation Instructions

## PRECISION Vacuum Oven Model 19

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### INSTALLATION AND OPERATION INSTRUCTIONS MODEL 19 VACUUM OVEN

#### NOTE

Refer to the packing checklist for the list of accessories sent with this unit. Make certain you have all accessories before destroying the shipping container and packing material.

#### Position Vacuum Oven

Place the oven on a bench or stand at a convenient working height.

#### CAUTION

Maintain a minimum of 12 inches clearance between the oven and any combustible surfaces.

#### Install Shelves

Two (2) shelves are provided with the oven. Remove the wrapped shelves from the chamber. Unwrap the shelves and place in the chamber as desired.

#### NOTE

Heaters are located on side walls of chamber. Placing an item in direct contact with the side walls may cause overheating of the item.

#### Install Thermometer

Hang the supplied thermometer onto the thermometer hook located near the left front corner of the chamber.

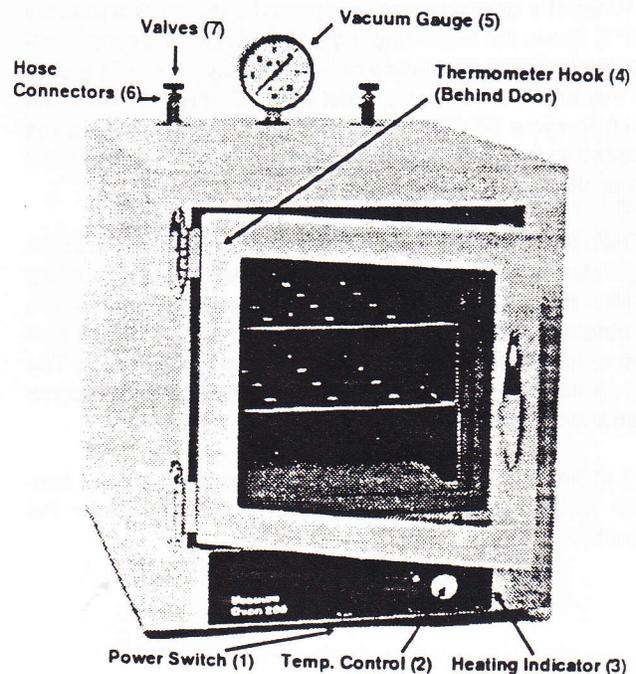
#### Connect Power Cord

#### CAUTION

Check voltage and watts stamped on the data plate for compatibility before connecting oven to power source. The data plate can be found near the power cord. First ensure that the power switch is in the "off" position.

#### Control and Indicator Description

1. Power Switch. Applies power to the oven heater controls.
2. Temp. Control. Regulates the oven temperature.
3. Heating Indicator. Indicates when the oven is being heated.
4. Thermometer Hook. Provides a means of installing a thermometer for monitoring the chamber temperature with a glass column thermometer.
5. Vacuum Gauge. Indicates chamber vacuum in INCHES OF MERCURY.
6. Hose connections. Used for connecting MINIMUM 1/4 inch vacuum tubing between oven and vacuum pumping systems, or other apparatus.
7. Valves. Used for evacuating chamber, controlling vacuum, or for bleeding air and other gasses into chamber.



**NOTE**

Procedure I below refers to standard model 5831 Vacuum Ovens. If you have ordered your model with an optional safety control, skip Procedure I and refer to Procedure II.

**PROCEDURE I**

Turn the power switch on. Switch light should glow, indicating power is available to the oven.

Turn the Temp. Control knob fully clockwise. The "Heating" indicator will glow when the unit is heating. When the temperature reaches the desired operating level (as indicated on the thermometer) turn the Temp. Control knob counterclockwise until the "Heating" indicator just turns off. Allow the temperature to cycle on and off several times (3 to 4 hours) to make sure the oven has stabilized. Adjust the Temp. Control knob up or down as necessary.

**PROCEDURE II**

Turn the power switch on. Switch light should glow, indicating power is available to the oven.

Turn the regulating control knob and the safety control knob fully clockwise. The regulating pilot light should glow, indicating the oven is being heated.

When the desired safety temperature is reached (usually 2-3°C above the regulating temperature) turn the safety control knob counterclockwise until the safety pilot light glows. At this time the regulating pilot light will turn off. Allow the oven to cycle several times (3 to 4 hours) to establish the desired safety temperature. Adjust the safety control knob up or down as necessary.

Turn the regulating control knob counterclockwise until the regulating or safety pilot light turns off. Adjust the regulating control knob down until the desired operating temperature is obtained. Allow the oven to cycle several times (3 to 4 hours) to establish the desired operating temperature. The regulating pilot light will cycle on and off, indicating normal operation. The safety pilot light should stay off.

If at any time the safety pilot light glows, check the controls to be sure the safety control is not set below the regulating control.

**NOTE**

When the oven is new and is first heated, the insulation will become scorched and some smoke and burning odor will occur. It is normal for this condition to last 2 to 3 hours at high heat.

**Vacuum Operation**

The following information serves as a guide to operation of the vacuum system.

**Vacuum Oven Performance at or Below 1 mm Absolute**

The following pumping system capacities are necessary to maintain vacuums at or below 1 mm Absolute:

- 1.50 liters per minute at 1 mm mercury.
- 15 liter per minute at 100 microns mercury.
- 150 liters per minute at 10 microns mercury.

The total variable leak rate of the oven is 3 inches of mercury per cubic foot per 24 hours at 29 to 26 inches of mercury.

**Capacity of Vacuum Pump**

Precision Scientific, Inc. recommends using a vacuum pump with four (4) times the capacity of the variable leak rate and load requirements. A mechanical, positive displacement type vacuum pump with the proper free air capacity rating will give substantially constant pumping speed to its ultimate pressure.

However, a positive displacement pump may evacuate the chamber too slowly before 1 mm, Precision Scientific, Inc. recommends the use of a diffusion pump properly matched to the mechanical pump for evacuating the chamber below 1 mm.

### Size of Tubing to Vacuum Pump

For vacuum levels below 1 mm to 10 microns, use minimum 1/4 inch vacuum tubing, keeping the connections between the oven and vacuum system as short, straight, and unrestricted as possible.

### Vacuum Sealing Agents

High vacuum silicone grease is often necessary to provide a proper seal at tubing connections, valve connections, door seals, etc. This is especially important at high vacuums. However, there are restrictions to using silicone grease, depending upon the type of materials placed in the oven. Refer to the maintenance section of this manual for restrictions.

### Out Gassing

The operation of the oven at high temperature while evacuating the chamber will help drive off absorbed gasses on the walls and other surfaces and facilitate attainment of high vacuums.

### Evacuating Chamber

Connect vacuum tubing to either hose connection on top of vacuum oven. Turn on the vacuum pump, then open the valve on the oven. The vacuum gauge will indicate when the desired pressure level is obtained. Once obtained, close the valve, and turn off the vacuum pump. Air may be bled into the chamber through the unused valve to raise the pressure level.

### Periodic Maintenance

1. If the oven fails to maintain set temperature, it may indicate a problem with the Temp. Control, or possibly a heating element failure. Contact your local service representative.
2. Gaskets should be checked periodically for hardening, shrinking, deterioration or other signs of wear. It is advisable to keep several gaskets available for use as replacements.
3. The oven is equipped with silicone door gaskets, unless specified otherwise. Do not use silicone door gaskets or vacuum grease when evaporating solvents in the oven or when using high aniline point oils. BUNA-N gaskets should be used in applications when evaporating solvents or when using high aniline point oils.
4. The interior finish or silicone gaskets may be damaged by the following:
  - Diesel oil
  - JP-4 oil
  - MIL-0-5606
  - Hydraulic Fluids
  - Butyl Acetate
  - Carbon Tetrachloride
  - Ethylene Chloride
  - Gasoline
  - Kerosene
  - Zylene
  - Methyl Chloride
  - Stoddard Solvent
  - Toluene
  - Aromatic Chlorinated Solvent
5. Refer to the following chart as a guide to what type of door gasket material is best suited for your needs.

## DOOR GASKET MATERIAL COMPATIBILITY GUIDE

	Nitrile (Buna N)	Fluorocarbon (Viton)	Silicone
<b>General</b>			
Continuous High Temperature Limit	257°F. 125°	437°F. 225°C	482°F. 250°C
Low Temperature Capability	-67°F. -55°C	-40°F. -40°C	-103°F. -75°C
Dynamic Service/Abrasion Resistance	EXCELLENT	VERY GOOD	POOR
Compression Set Resistance	VERY GOOD	VERY GOOD	EXCELLENT
<b>Fluid Compatibility</b>			
Acid. Inorganic	FAIR	EXCELLENT	GOOD
Acid. Organic	GOOD	GOOD	EXCELLENT
Aging (Oxygen, Ozone, Weather)	FAIR/POOR	VERY GOOD	EXCELLENT
Air	FAIR	VERY GOOD	EXCELLENT
Alcohols	VERY GOOD	FAIR	VERY GOOD
Aldehydes	FAIR/POOR	POOR	GOOD
Alkalis	FAIR/GOOD	GOOD	VERY GOOD
Amines	POOR	POOR	GOOD
Animal Oils	EXCELLENT	VERY GOOD	GOOD
Esters, Alkyl Phosphate (Skydrol)	POOR	POOR	GOOD
Esters, Aryl Phosphate	FAIR/POOR	EXCELLENT	GOOD
Esters, Silicate	GOOD	EXCELLENT	POOR
Ethers	POOR	POOR	POOR
Hydrocarbon Fuels, Aliphatic	EXCELLENT	EXCELLENT	FAIR
Hydrocarbon Fuels, Aromatic	GOOD	EXCELLENT	POOR
Hydrocarbon, Halogenated	FAIR/POOR	EXCELLENT	POOR
Hydrocarbon Oils, High Aniline	EXCELLENT	EXCELLENT	VERY GOOD
Hydrocarbon Oils, Low Aniline	VERY GOOD	EXCELLENT	FAIR
Impermeability to Gasses	GOOD	VERY GOOD	POOR
Ketones	POOR	POOR	POOR
Silicone Oils	EXCELLENT	EXCELLENT	GOOD
Vegetable Oils	EXCELLENT	EXCELLENT	EXCELLENT
Water/Steam	GOOD	FAIR	FAIR

## Maintenance of Stainless Steel

The following chart is provided as a guide to cleaning the interior surface of your vacuum oven.

### EFFECTIVE METHODS FOR CLEANING STAINLESS STEEL

	Cleaning Agent*	Method of Application**	Effect on Finish
<b>Routine Cleaning</b>	Soap, or ammonia, or detergent and water.	Sponge with cloth, then rinse with clear water and wipe dry.	Satisfactory for use on all finishes.
<b>Smears and Fingerprints</b>	Arcal 20, Lac-O-Nu, Lumin Wash, O' Cedar Cream Polish, Stainless Shine, or Wind-O-Shine.	Rub with cloth as directed on the package.	Satisfactory for use on all finishes. Provides barrier film to minimize prints.
<b>Stubborn spots and stains, baked-on splatter, and other light discolorations</b>	Allchem Concentrated Cleaner or Lusteel.	Apply with damp sponge or cloth.	Satisfactory for use on all finishes.
	Samae, or Cameo Copper Cleaner.	Rub with damp cloth.	Satisfactory for use on all finishes if rubbing is light.
	Cooper's Stainless Steel Cleaner, or Revere Stainless Steel Cleaner.	Rub with damp sponge or cloth.	Use in direction of polish lines on No. 4 (polished) finish. Use light pressure on No. 2 (mill) finishes and Nos. 7 and 8 (polished) finishes.
	Liquid NuSteel.	Rub with dry cloth. Use small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Paste NuSteel, DuBois Temp, or Aerogroom.	Rub with dry cloth using a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Household cleansers, such as Old Dutch, Lighthouse, Sunbrite, Wyandotte, Bab-O, Gold Dust, Sapolio, Bon Ami, Ajax, Comet, Off, or Stainless Steel Super Shine.	Rub with a damp cloth. May contain chlorine bleaches. Rinse thoroughly after use.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Grade F Italian pumice, Steel Bright, Lumin Cleaner, Zud, Restoro, Sta-Clean, or Highlite.	Rub with a damp cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Penny-Brite or Copper-Brite.	Rub with a dry cloth using a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	DuBois Stainless Steel Polish.	No rubbing - just spray lightly on dry surface and wipe off.	Forms thin, hard satin-sheen finish that resists grease stains, water marks, fingerprints, etc.

**EFFECTIVE METHODS FOR CLEANING STAINLESS STEEL (cont)**

	<b>Cleaning Agent*</b>	<b>Method of Application**</b>	<b>Effect on Finish</b>
<b>Heat Tint or Heavy Discoloration</b>	Penny-Brite or Copper-Brite.	Rub with dry cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Paste NuSteel, DuBois Temp, Tarnite, or Kelox.	Rub with dry cloth or stainless steel wool.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Revere Stainless Steel Cleaner, Take-Off, or AC-60.	Apply with damp sponge or cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
	Allen Polish, Steel Bright, Wyandotte, Bab-O, Zud, Dubrite, or Prepare Dex.	Rub with a damp cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and Nos. 7 and 8 (polished) finishes.
<b>Burnt-on Foods and Grease, Fatty Acids, Milkstone (where swabbing or rubbing is not practical)</b>	Easy-Off, De-Grease-It, 4 to 6% hot solution of such agents as trisodium phosphate, or sodium tripolyphosphate, or 5 to 15% caustic soda solution.	Apply generous coating. Allow to stand for 10-15 minutes. Rinse. Repeated application may be necessary.	Excellent removal, satisfactory for use on all finishes.

	<b>Cleaning Agent*</b>	<b>Method of Application**</b>	<b>Effect on Finish</b>
<b>Tenacious Deposits, Rusty Discolorations, Industrial Atmospheric Stains</b>	Oakite No. 33, Dilac, Texo 12, Texo N.Y., Flash-Klenz, Caddy Cleaner, Turco Scale 4368 or Permag 57.	Swab and soak with clean cloth. Let stand 15 minutes or more according to directions on package, then rinse and dry.	Satisfactory for use on all finishes.
<b>Hard Water Spots and Scale</b>	Vinegar.	Swab or wipe with cloth. Rinse with water and dry.	Satisfactory for all finishes.
	5% oxalic acid, 5% sulfamic acid, 5 to 10% phosphoric acid, or Dilac, Oakite No. 33, Texo 12, Texo N.Y.	Swab or soak with cloth. Let stand 10-15 minutes. Always follow with neutralizer rinse, and dry.	Satisfactory for all finishes. Effective on tenacious deposits or where scale has built up.
<b>Grease and Oil</b>	Organic solvents such as carbon tetrachloride, trichlorethylene, acetone, kerosene, gasoline, benzene, alcohol, and chlorethane n.u.	Rub with cloth. Organic solvents may be flammable and or toxic. <b>OBSERVE ALL PRECAUTIONS AGAINST FIRE.</b> Do not smoke while vapors are present, and <b>BE SURE AREA IS WELL VENTILATED.</b>	Satisfactory for use on all finishes.

**SUGGESTIONS:**

- Use the mildest cleaning procedure that will do the job effectively.
- Rub in the direction of polish lines for maximum effectiveness and to avoid marring the surface.
- Rinse thoroughly with fresh water after every cleaning operation.
- Wipe dry to avoid water marks.

**NOTES**

\*Use of proprietary names is intended only to indicate a type of cleaner, and does not constitute an endorsement, nor is omission of any proprietary cleaner to imply its inadequacy. It should be emphasized that all products should be used in strict accordance with instructions on package.

\*\*In all applications a stainless steel wool or sponge or fibrous brush or pads are recommended. Avoid use of ordinary steel wool or steel brushes for scouring stainless steel.

*Little oven*

## SPECIFICATIONS

MODEL	19
Vacuum range	Atmosphere to 30" Hg.* with adequate pump
Temperature range	35° C to 200° C
Shelf capacity	0.55 sq. ft. (203 sq. cm) per shelf 2 shelves standard
Inside dimensions, usable	(W-D-H)
Inches	8 x 12 x 8
Centimeters	20 x 30.5 x 20
Outside dimensions	(W-D-H)
Inches	13 x 16 x 18
Centimeters	33 x 41 x 46
Standard electrical service	500 Watts, 120 VAC 50/60 Hz, 4.2 Amps
Optional electrical service	500 Watts, 220/240 VAC 50/60 Hz, 2.1 Amps
Net weight	
Pounds	42
Kilograms	19

\*within 10 Microns

## REPLACEMENT PARTS LIST

### MODEL 19 VACUUM OVEN

Part No.	Description
240616	Power Switch (120 Volt)
240600	Power Switch (220/240 Volt)
239189	Temp. Control (Thermostat)
220180	Temp. Control Knob
239184	Thermal Cut-Out
00356305	Pilot Light (120 Volt)
00356306	Pilot Light (220/240 Volt)
307089	Thermometer
269110	Vacuum Valve
252228	Vacuum Gauge
247416	Heating Element (All Voltages)
97054	Shelf
167331	Door Gasket, Silocone
64304	Door Gasket, Buna-N
2011-055	Door Gasket, Viton
330259	Glass Window
542081	Door Assembly
93665	Door Hinge
222065	Door Handle
241078	Rubber Feet

WHEN ORDERING REPLACEMENT PARTS, PLEASE SPECIFY THE MODEL NUMBER AND SERIAL NUMBER OF YOUR UNIT, AND DATE PURCHASED. THE MODEL AND SERIAL NUMBERS CAN BE FOUND ON THE NAMEPLATE WHICH IS LOCATED NEAR THE SERVICE CORD.

