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## Tabletop Autoclaves

**Models 1730, 2340, 2540, 3140, 3850, 3870 M & MK  
1730MK Valueklave**

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Cat. No. MAN205-0007000EN Rev. 27



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# Operation and Maintenance Manual

## Tabletop Autoclaves

**Models 1730, 2340, 2540, 3140, 3850, 3870 M &  
MK 1730MK Valueklave**



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# 1. General Information

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Read the Operating Instructions carefully, before beginning any operation on the autoclave!

## 1.1 Manufacturer and US Official Correspondence Information



The Autoclave is manufactured by Tuttnauer. Ltd. Har Tuv B Industrial Zone, P.O. Box 170, Beit Shemesh, 9910101, Israel. ☎ Tel: 972 2 9904611 📠 Fax: 972 2 9904730

The US Official Correspondence is:

📠 Tuttnauer U.S.A. Co, Ltd., 345 Oser Avenue Hauppauge, NY, 11788, U.S.A. ☎ Tel: (631) 737-4850, (800) 624-5836, 📠 Fax: (631) 737-0720

## 1.2 Directives and Standards

Every autoclave meets the provisions of the following Directives and is in compliance with the following Standards:

### Regulation (EU) 2017/745 (MDR)

#### Medical Device Single Audit Program – (MDSAP)

<b>ISO 9001</b>	Quality Management System
<b>EN ISO 13485</b>	Quality Management System – Medical Devices
<b>ISO 14001</b>	Environmental management system
<b>ISO 17025</b>	General requirements for the competence of testing and calibration laboratories
<b>EN ISO 14971</b>	Medical devices – Application of risk management for medical devices
<b>ASME Code</b>	Section I and Section VIII. Div. I
<b>PED</b>	2014/68/EU
<b>Chinese Regulations</b>	Special Equipment Licensing Office
<b>ISO 17665</b>	Sterilization of health care products – Moist heat
<b>ANSI / AAMI / ST79</b>	Comprehensive guide to steam sterilization and sterility assurance in health care facilities
<b>IEC 61010-1 / UL 61010-1</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
<b>IEC 61010-2-040</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-040: Requirements for sterilizers and washer-disinfectors used to treat medical materials
<b>EN 61326-1</b>	EMC Requirements for Electrical Equipment
<b>IEC 62304</b>	Medical Device Software – Software life cycle processes

### 1.3 Symbols Description

	Manufacturer
	Year of Manufacturing
	Country of Manufacture
	Medical Device
	Model Number
	Serial Number
	Consult the Operation and Maintenance Manual (User Manual) before use.
	Keep away from sunlight and protect from heat.
	For Indoor Use Only.
	Keep dry.
	Disposal according to electronic scrap ordinance.

	<p>This side up (during transport and shipment).</p>
	<p>Fragile (during transport and shipment).</p>
 <p>OR</p> 	<p>A warning or precaution as detailed in the Operation and Maintenance Manual (User Manual).</p>
 <p>OR</p> 	<p>Caution! Hot Surface</p>
	<p>Caution! Hot steam</p>
	<p>Protective earth (Ground)</p>

## 1.4 General Description of the Device

This autoclave is an electrically heated sterilizer using steam as the sterilizing agent. It is a manually operated device, with a control system based upon steam pressure.

The operator can select a sterilization temperature from within a range of 212°F - 273°F (100°C - 134°C). This allows for the sterilization of heat sensitive material at a low sterilization temperature, as well as providing for faster sterilization at higher temperatures for materials able to withstand the higher sterilization temperatures.

All models feature an easy-to-use control panel. The machines are ruggedly built using 316L stainless steel, copper, brass, and aluminum. To guard against rusting, no iron components are used. All models include a drying system for wrapped items.

### 1.4.1 Safety features

The safety features include a double locking door mechanism (door tightening bolt and locking bellows), a mechanical pressure relief valve, over temperature thermostats and a double pole circuit breaker.

#### Pressure Door Lock System (Door Bellow)

The **Door Bellows** is a safety device that prevents the door from opening when the chamber is pressurized.

The system utilizes the buildup of pressure in the chamber to expand a flexible Silicon-rubber bellows. The bellows pushes a metal pin into a groove on the tightening bolt of the Door Closing Device.

This prevents the operator from opening the door when there is pressure in the chamber. When the steam is released, this bellow returns to its original position, drawing the pin with it and releasing the tightening bolt.

This manual is intended for the user and gives the user a general understanding of the instrument and the best ways to operate and take care of it, to obtain optimum effective results.

After reading this manual, operating the autoclave will be easy. However, since this instrument is built with high technology sensitive components, no attempt should be made by the user or any other unauthorized person to repair or recalibrate it.

## 1.5 Indications for Use

The autoclave is designed for the sterilization of medical and surgical goods such as wrapped and unwrapped solid, hollow, and porous loads used in healthcare facilities (e.g., hospitals, nursing homes, extended care facilities, freestanding surgical centers, clinics, and medical & dental clinics) .

## 1.6 Intended Users

The autoclave is intended for use by hospital personnel and other medical personnel .

All autoclave users must receive training in proper usage from an experienced employee. Every new employee must undergo a training period under an experienced employee.

## 1.7 Warranty Description

**This warranty does not include routine cleaning or preventive maintenance, which must be performed as described in section – Preventive and Scheduled Maintenance.**

This product is sold with a **limited one (1) year parts-only warranty**. Tuttnauer's obligation under this warranty is strictly limited to the **replacement of defective parts**. Labor, travel, and any other associated service costs are **not covered** under this warranty.

This warranty is void if the unit is not purchased from an **authorized Tuttnauer dealer**, or if the product is damaged due to misuse, neglect, improper handling or installation, unauthorized service, alteration, accident, fire, natural disasters, or static discharge.

No other warranties or obligations, whether express or implied, are provided.

**The autoclave must be used strictly in accordance with the instructions in this manual!**

## 1.8 Warranty Statement

The warranty registration must be completed and returned to our service departments; within fourteen (14) days of purchase or the warranty will be void.

Our Technical Service Department can be reached at:

✉ **Tuttnauer U.S.A. Co, Ltd.** 345 Oser Avenue Hauppauge, NY, 11788, USA.

☎ Tel (631) 737 4850, (800) 624 5836, 📠 Fax: (631) 737 0720

**Note:** If there is any difficulty with this autoclave, and the solution is not covered in this manual, contact our representative or Tuttnauer directly. Do not attempt to service this autoclave yourself. Describe the difficulty as clearly as possible so we may be able to diagnose the problem and provide a prompt solution.

If the autoclave is equipped with a printer, send along a copy of the last printout for our inspection.

If replacement parts are required, specify the model and serial number of the machine.

No autoclaves will be accepted for service without prior authorization from Tuttnauer.

All transportation costs must be paid both ways by the owner.

This warranty will be void if the unit is not purchased from an authorized Tuttnauer dealer.

## 1.9 Incoming Inspection

Upon receiving your Tuttnauer Autoclave, carefully inspect the outside of the shipping carton for signs of damage. If any damage to the carton is found, note the location with respect to the autoclave and check that area of the autoclave carefully once it is fully unpacked. Observe packing method and retain packing materials until the unit has been inspected. Mechanical inspection involves checking for signs of physical damage such as: scratched panel surfaces, broken knobs, etc.

**If any damage is found, contact your dealer as soon as possible so that they can file a claim with the shipping carrier and notify Tuttnauer.**

All Tuttnauer products are carefully inspected prior to shipment and all reasonable precautions are taken in preparing them for shipment to assure safe arrival at their destination.

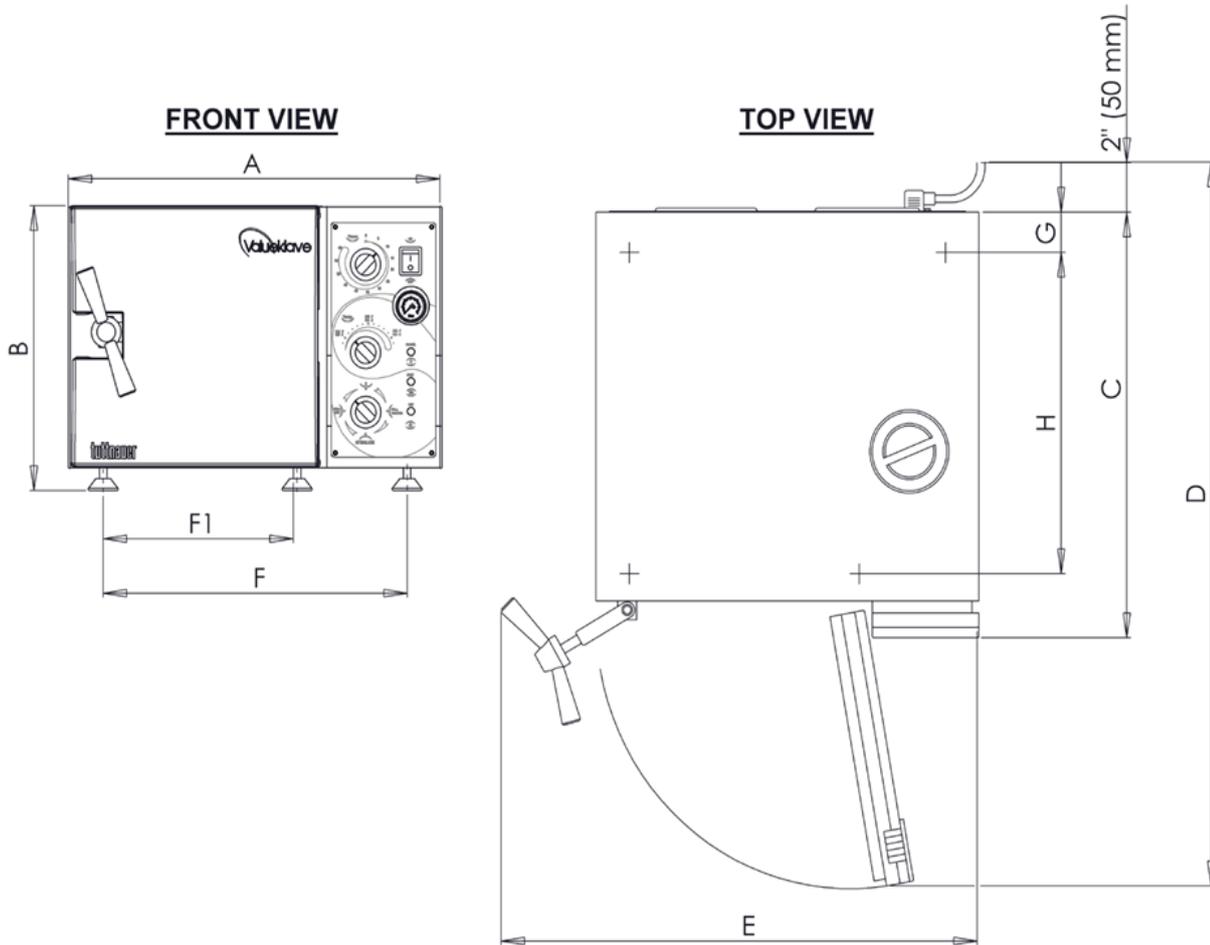


**Caution!**

**Lifting and carrying should always be done by two people.**

## 1.10 Device Specifications

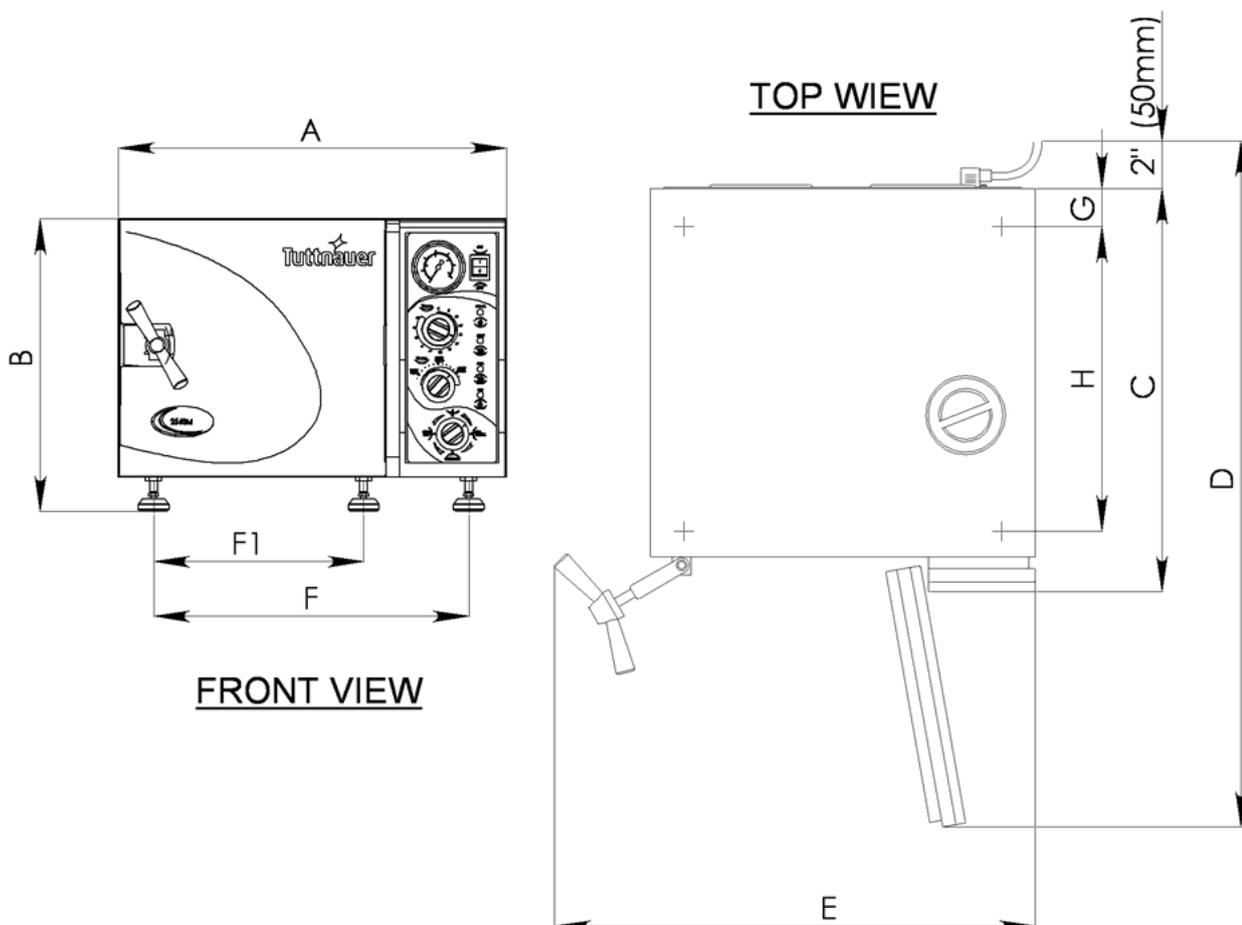
### 1.10.1 Model 1730



Dimensions	Model	1730 M, MK - Valueklave	
		mm	in
Overall Dimensions	A	440	17.4
	B	305	12.0
	C	455	17.9
Maximum dimensions (door open)	D	750	29.5
	E	560	22.0

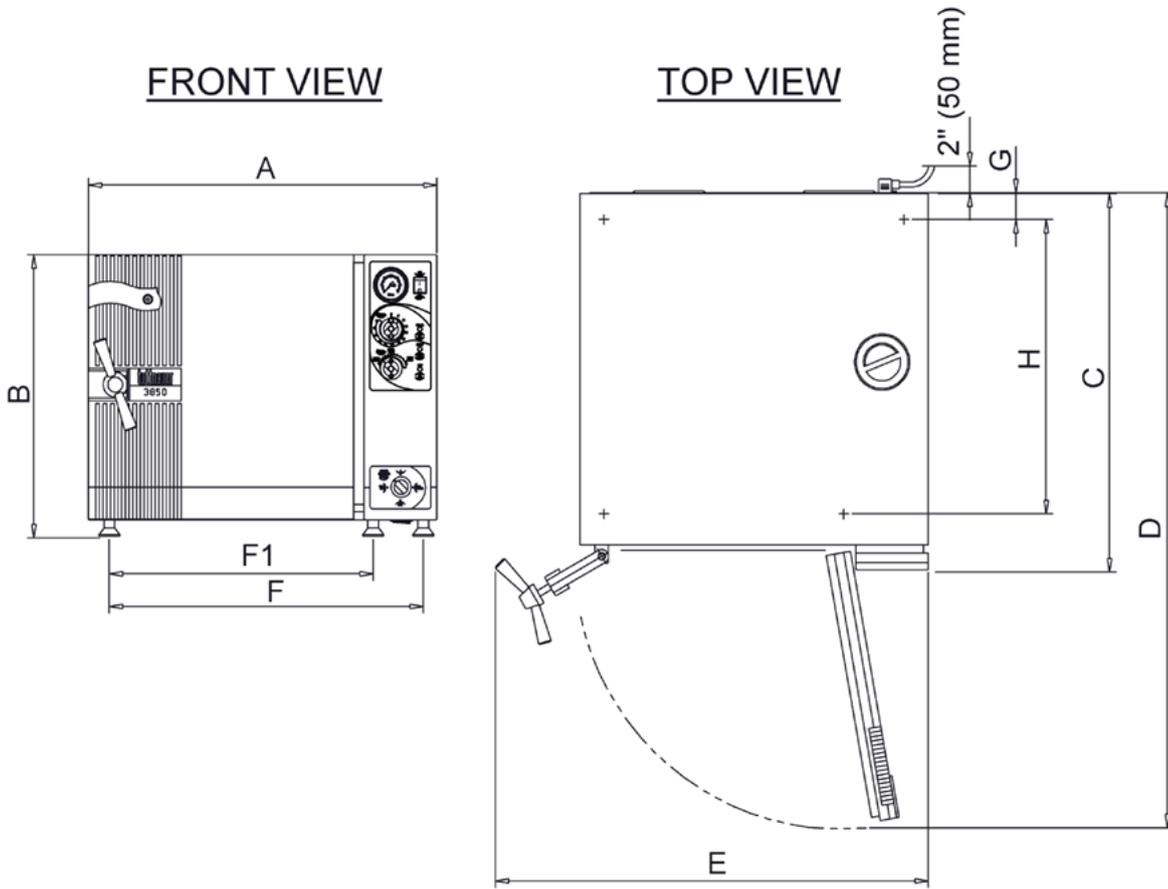
Dimensions	Model	1730 M, MK - Valueklave	
		mm	in
Distance between supporting legs F1- front legs F- rear legs	F	339	13.4
	F1	347	13.7
	G	50	2.0
	H	315	12.4
Chamber Diameter		170	6.7
Chamber Depth		340	13.4

1.10.2 Models 2340, 2540



Dimensions	Model	2340 M, MK		2540 M, MK	
		mm	in	mm	in
Overall Dimensions	A	510	20.0	510	20.0
	B	365	14.4	365	14.4
	C	545	21.5	545	21.5
Maximum dimensions (door open)	D	910	35.8	910	35.8
	E	655	25.8	655	25.8
Distance between supporting legs F1- front legs F- rear legs	F	299	11.8	299	11.8
	F1	422	16.6	422	16.6
	G	50	2.0	50	2.0
	H	400	15.8	400	15.8
Chamber Diameter		230	9.1	254	10
Chamber Depth		470	18.5	475	18.7

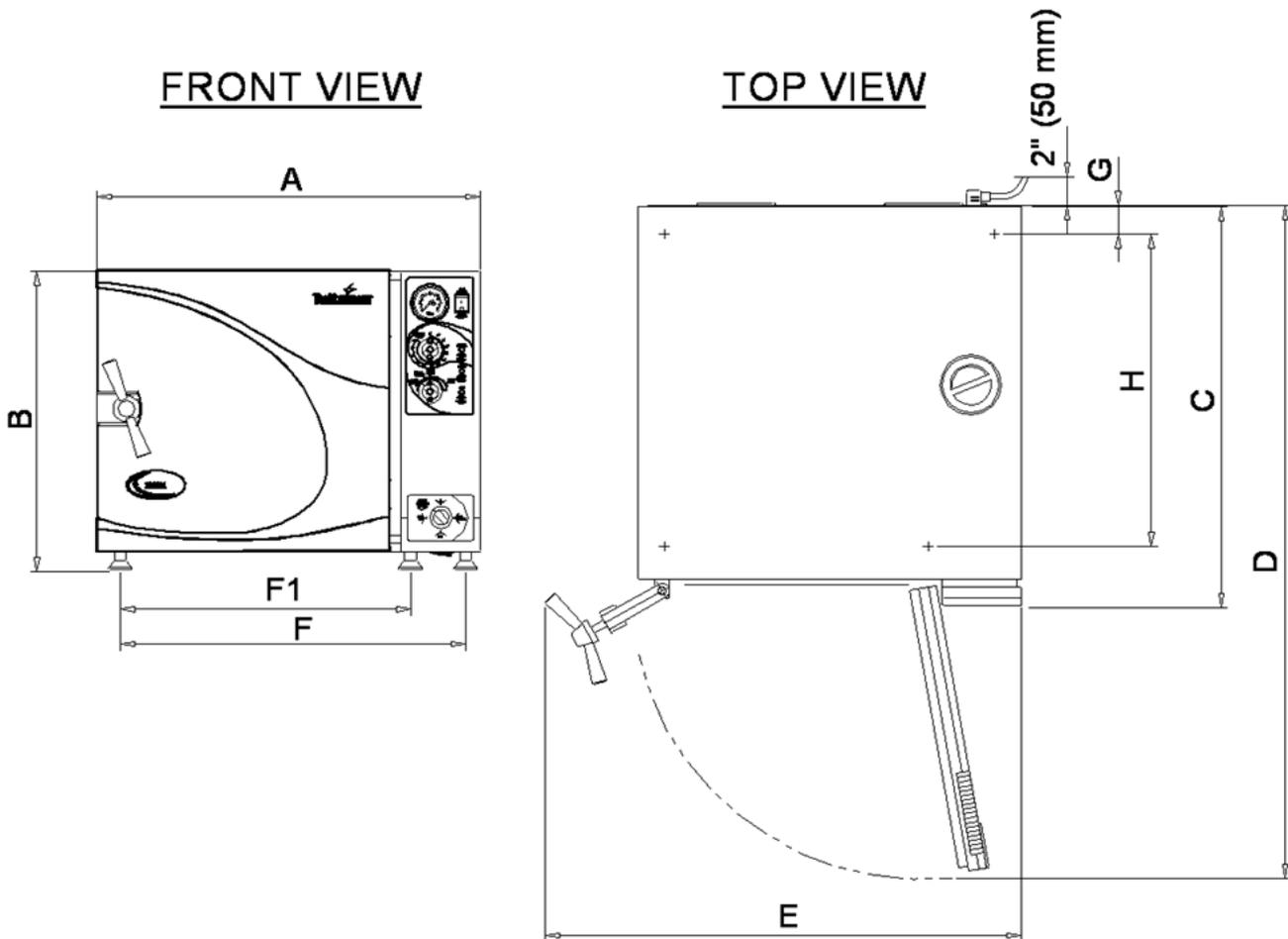
1.10.3 Model 3140



Dimensions	Model	3140 M	
		mm	in
Overall Dimensions	A	590	17.4
	B	450	12.0
	C	556	17.9
Maximum dimensions (door open)	D	990	29.5
	E	755	22.0

Dimensions	Model	3140 M	
		mm	in
Distance between supporting legs F1- front legs F- rear legs	F	371	14.6
	F1	488	19.2
	G	50	2.0
	H	386	15.4
Chamber Diameter		312	12.3
Chamber Depth		391	15.4

1.10.4 Models 3850, 3870



Dimensions	Model	3850 M		3870 M	
		mm	in	mm	in
Overall Dimensions	A	665	26.0	665	26.0
	B	525	20.7	525	20.7
	C	695	27.5	875	34.5
Maximum dimensions (door open)	D	1155	45.5	1335	53.0
	E	815	32.0	815	32.0
Distance between supporting legs F1- front legs F- rear legs	F	564	22.2	564	22.2
	F1	450	17.7	450	17.7
	G	50	2.0	50	2.0
	H	555	21.8	725	30.5
Chamber Diameter		384	15.1	254	15.1
Chamber Depth		580	22.8	475	29.9

### 1.10.5 Technical Specifications

Models	Chamber dimensions DIA x D	Volume of chamber	Volume of mineral free water reservoir	Tray dimensions D X W X H	No. of trays	No. of Cassettes (Optional)	
						Full	Half
1730 M, MK Valueklave	6.7" x 13.4" (170 x 340 mm)	2 US gal. (7.5 liters)	0.66 US gal. (3.0 liters)	11.6" x 4.7" x 0.8" (295 x 120 x 20 mm)	3	-	2
2340 M, MK	9" x 18.5" (230 x 470 mm)	5 US gal. (19 liters)	0.66 US gal. (3.0 liters)	16.3" x 6.7" x 0.8" (415 x 170 x 20 mm)	3	2	2
2540 M, MK	10" x 18.7" (254 x 475 mm)	6 US gal. (23 liters)	0.66 US gal. (3.0 liters)	16.3" x 6.7" x 0.8" (415 x 170 x 20 mm)	4	3	3
3140 M	12.3" x 15.4" (312 x 391 mm)	7.8 US gal. (34.4 liters)	0.66 US gal. (3.0 liters)	16.1" x 10.1" x 1" (408 x 250.6 x 25 mm) 16.1" x 7.8" x 1" (408 x 198 x 25 mm)	2	4	4
3850 M	15" x 23" (380 x 580 mm)	17 US gal. (65 liters)	2.0 US gal. (7.5 liters)	20" x 11" x 1" (500 x 280 x 25 mm) 20" x 14" x 1" (500 x 350 x mm)	2	-	-
3870 M	15" x 30" (380 x 760 mm)	22 US gal. (84 liters)	2.0 US gal. (7.5 liters)	26" x 11" x 1" (670 x 280 x mm) 26" x 14" x 1" (670 x 350 x mm)	2	-	-

### 1.10.6 Maximum Solid Load and Shipping Weight / Volume

Models	Maximum Solid Load Sizes		Shipping Weight	Shipping Volume
	lbs	kg		
1730	6.0	2.7	54.7 lbs. (24.8 kgs.)	6.35 cu.f. (0.18 m3)
2340	7.0	3.2	78.7 lbs. (35.7 kgs.)	9.4 cu.f. (0.27m3)
2540	8.8	4.0	83.3 lbs. (47.8 kgs.)	9.4 cu. f. (0.27m3)
3140	11.0	5.0	132 lbs.(60 kgs)	12.4 cu.f(0.35 m3)
3850	13.6	6.0	196 lbs. (89 kgs.)	22.2cu.f. (0.63 m3)
3870	14.6	6.4	225 lbs. (102 kgs.)	26.8cu.f (0.76m3)

### 1.10.7 Electrical Data

	1730		2340		2540		3140	3850	3870
	M	MK MK-V	M	MK	M	MK	M	M	M
Total power 120V	8.8A	11.2A	11.7A	-	11.7A	-	20.0A	-	-
Total power 230V	4.6A	5.9A	6.0A	9.6A	6.0A	9.6A	10.4A	10.4A	13A
Heaters (W)	1050	1350	1400	2200	1400	2200	2400	2400	3000
Frequency	50 / 60 Hz								
Protection against electrical shock	IEC 61010-1								

## 1.11 Environmental Emission Information

1. The peak sound level generated by the autoclave is 70dBawith background noise of 60dBa .
2. The total heat per hour transmitted by the autoclave is < 100 W/h for models 1730/2340/2540 and < 150 W/h for models 3140/3850/3870 .

## 1.12 Water Quality



### Warnings!

The use of water for autoclaves that do not comply with the table below may have a severe impact on the working life of the sterilizer and can invalidate the manufacturer's warranty.

In the case of a generator:

1. Use only water having the characteristics stated in the table below. Using tap water will clog the system and invalidate the manufacturer's warranty.
2. Use only deionized water, having a maximum conductivity of 15  $\mu\text{s}/\text{cm}$ . Conductivity greater than 15  $\mu\text{s}/\text{cm}$  may cause failures.
3. The range of hardness value 0.7-2.0 mmol/l (70- 200 mg/l  $\text{CaCO}_3$ ). The use of soft water is strictly forbidden! Please consult a water specialist!

The distilled or mineral-free water supply shall be according to the table below:

### Suggested maximum limits of contaminants in water for steam sterilization per EN13060

Substance	Feed Water	Condensate
Evaporate residue	$\leq 10 \text{ mg/l}$	$\leq 1.0 \text{ mg/l}$
Silicate ( $\text{SiO}_2$ )	$\leq 1 \text{ mg/l}$	$\leq 0.1 \text{ mg/l}$
Iron	$\leq 0.2 \text{ mg/l}$	$\leq 0.1 \text{ mg/l}$
Cadmium	$\leq 0.005 \text{ mg/l}$	$\leq 0.005 \text{ mg/l}$
Lead	$\leq 0.05 \text{ mg/l}$	$\leq 0.05 \text{ mg/l}$
Rest of heavy metals except iron, cadmium, lead	$\leq 0.1 \text{ mg/l}$	$\leq 0.1 \text{ mg/l}$
Chloride (Cl)	$\leq 2 \text{ mg/l}$	$\leq 0.1 \text{ mg/l}$
Phosphate	$\leq 0.5 \text{ mg/l}$	$\leq 0.1 \text{ mg/l}$
Conductivity (at 20°C)	15 $\mu\text{s}/\text{cm}$	$\leq 3 \mu\text{s}/\text{cm}$

Substance	Feed Water	Condensate
pH value	5 to 7.5	5 to 7
Hardness	≤ 0.02 mmol/l	≤ 0.02 mmol/l
Appearance	Colorless, clean, without sediments	
<p><b>Note:</b> The condensate is produced from steam taken from the empty sterilizer chamber.</p>		

## 2. Safety

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### 2.1 Principle Safety Warnings and Precautions

The autoclave has unique characteristics. Please read and understand the operation instructions before the first operation of the autoclave. The following issues may require instructions guidance provided by the manufacturer: how to operate the autoclave, the door safety mechanism, the dangers involved in circumventing safety means, how to ensure that the door is closed, and how to select a correct sterilization program.

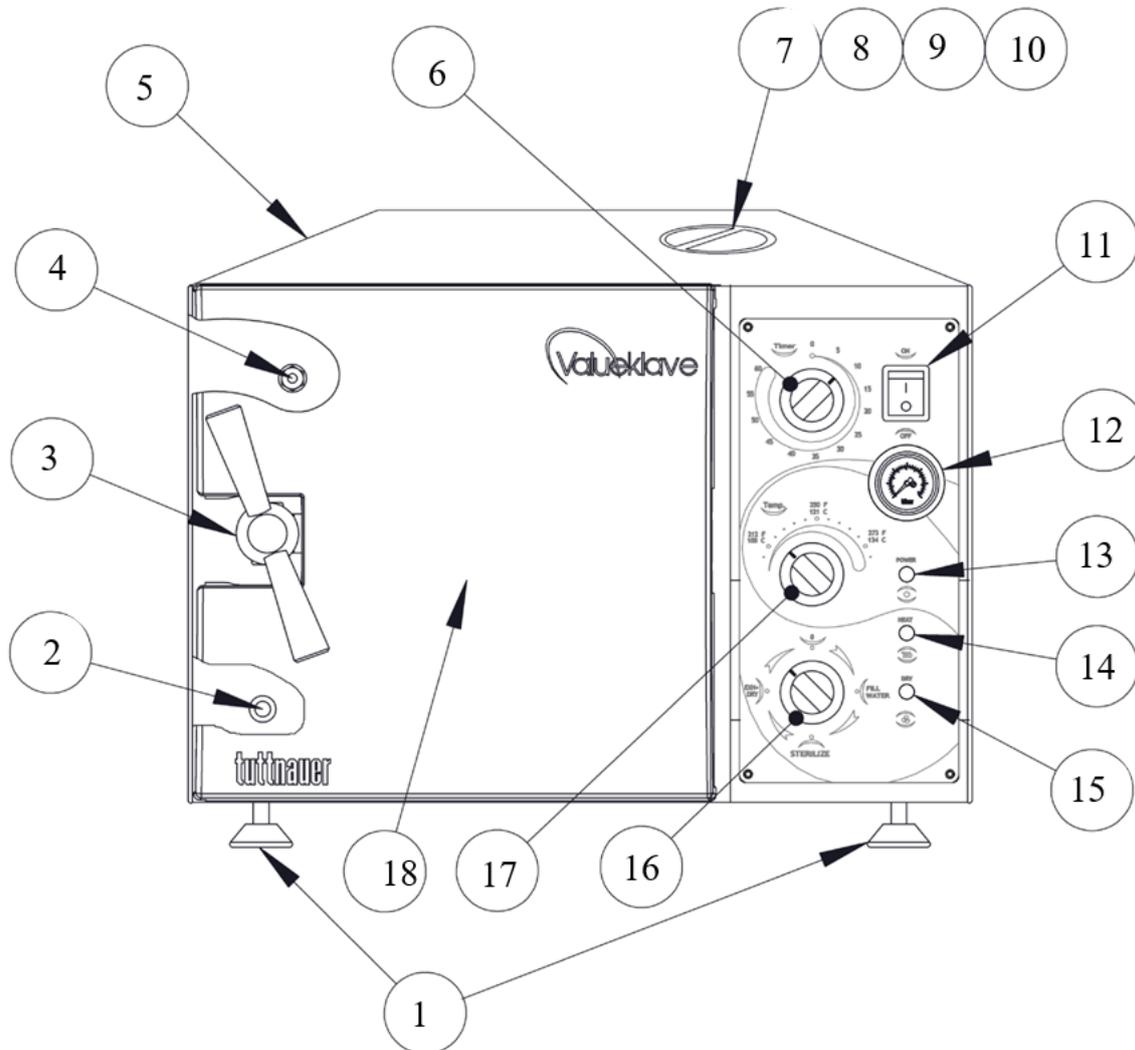
Never use the autoclave to sterilize corrosive products, such as: acids, bases and phenols, volatile compounds, or solutions such ethanol, methanol or chloroform nor radioactive substances.

- NEVER operate a new autoclave or steam generator before the safety, licensing, and authorization department has approved it for use.
- Always operate the autoclave strictly as instructed in this user manual.
- The device is designed to carry safeguards against cybersecurity threats. If you fear the device has been compromised, immediately contact the authorized representative.
- The instructed Steam Sterilization Program should be verified against the programs available in this autoclave. Verify that you have chosen the appropriate sterilization program. When sterilizing materials, make sure that the item can withstand the sterilization temperature.
- A written procedure should be established to ensure safe autoclave operation, including: Daily safety tests; seal inspection and door hinge inspection; smooth action of the closing mechanism; chamber cleaning; prevention of clogging; preservation from corrosion; and finally, what is permitted and what is prohibited for sterilization and choosing a sterilization program.
- If there is a steam generator – drain it daily.
- If there is an air compressor – drain it daily.
- Before use, check the autoclave chamber to ensure that no items have been left from a previous cycle.
- Before loading the autoclave, clean the strainer on the chamber floor.
- Load trays in a manner that enables steam to move freely among all items.
- Be careful: the surfaces may be hot! Before withdrawing trays, wear heat resistant gloves and avoid touching hot loads and surfaces.
- During loading and unloading, use safety gloves and glasses in accordance with local safety regulations and good practice.
- If applicable: Do not remove the top cover during a running cycle. Hot water / steam may exit!
- Only technical personnel having proper qualifications and holding technical documentation (including a Technician Manual), and adequate information are authorized to install and serve the apparatus.
- Mind the power socket. Keep it and its vicinity dry. Danger of electrocution.
- If applicable: Before moving the autoclave, make sure that the electrical cord is disconnected from the power and there is no pressure in the chamber.
- For devices that weigh less than 75Kg – The device is not designed for use on any standard slide out shelf. If necessary, it must be tested and/or rated for 75Kg or more.
- Once a month, ensure that the safety valves are operating.

- Once a year, or more frequently, effective tests must be performed by a certified technician, i.e., calibration and validation.
- Make sure there are no leaks, breaks, blockages, whistles or strange noises.
- Notify the person in charge immediately of any deviation or risk of proper function of the device or with the shipping carrier, and also notify the Tuttnauer representative.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.
- In order to assure proper operation of the autoclave, it should not be placed in the vicinity of electrical equipment which is not certified for Electromagnetic Compatibility according to IEC/EN 61326-1.
- The user shall report any serious incident that occurred in relation to the sterilizer, to the manufacturer and the authority having jurisdiction in their locale.
- Disposal of the device should be done in accordance with local laws.

## 3. Depiction of System Parts

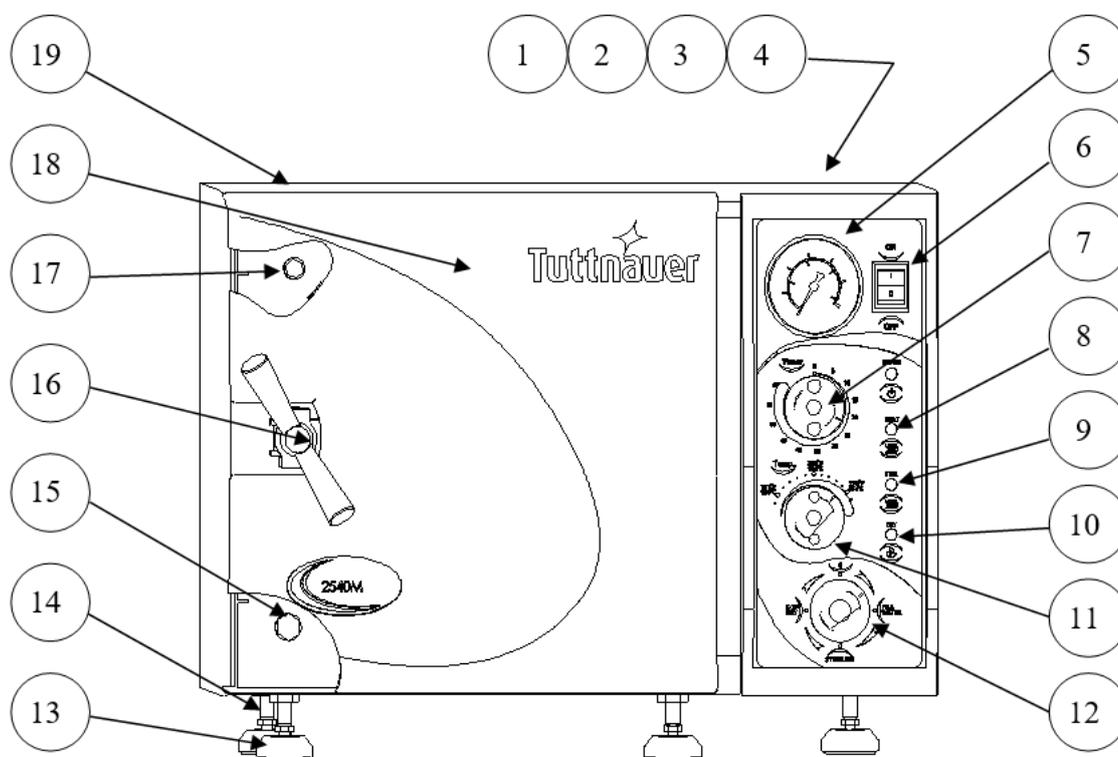
### 3.1 Front View - 1730 M, MK - Valueklave



No.	Description	No.	Description
1	Front legs	10	Air trap jet
2	Reservoir water drain valve	11	Main power switch
3	Door closing device	12	Pressure gauge
4	Door microswitch	13	Power indicator light
5	Autoclave cover	14	Heat indicator light

No.	Description	No.	Description
6	Timer	15	Dry indicator light
7	Water reservoir cover	16	Multipurpose valve
8	Water reservoir	17	Thermostat (B10) knob
9	Safety valve	18	Door cover

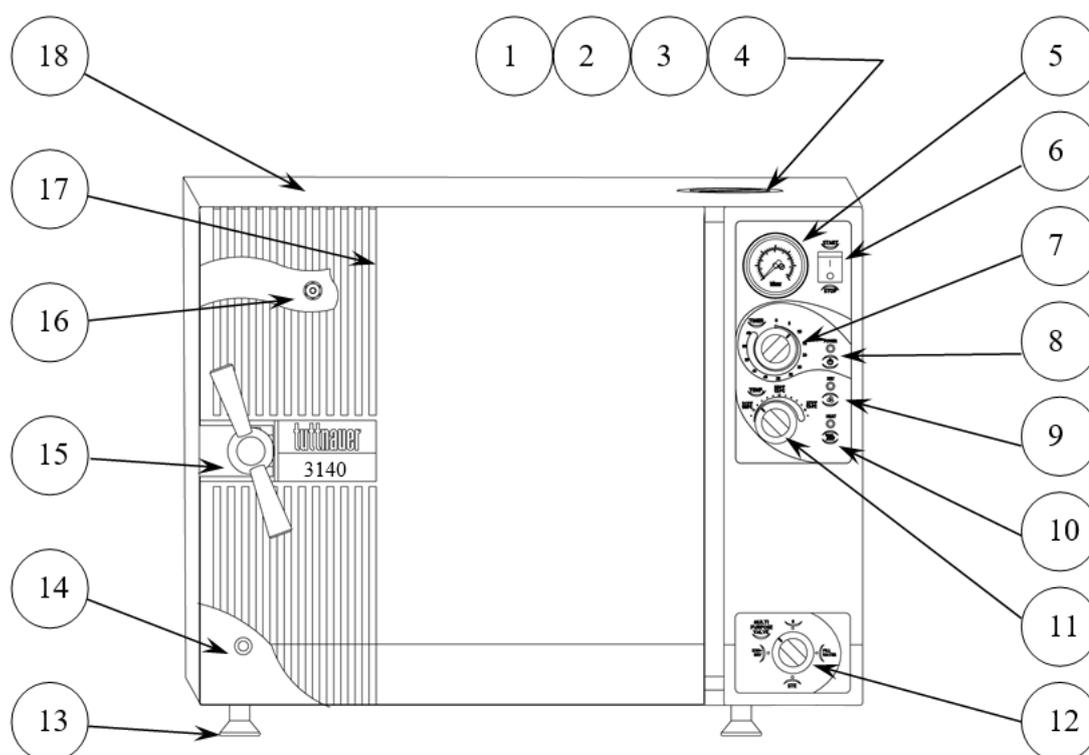
### 3.2 Front View - 2340/2540 M, MK



No.	Description	No.	Description
1	Water reservoir cover	11	Thermostat (B10) knob
2	Water reservoir	12	Multipurpose valve
3	Safety valve	13	Front legs
4	Air trap jet	14	Rear legs
5	Pressure Gauge	15	Reservoir water drain valve

No.	Description	No.	Description
6	Main power switch	16	Door closing device
7	Timer	17	Door microswitch
8	Power indicator light	18	Door cover
9	Heat indicator light	19	Autoclave cover
10	Dry indicator light		

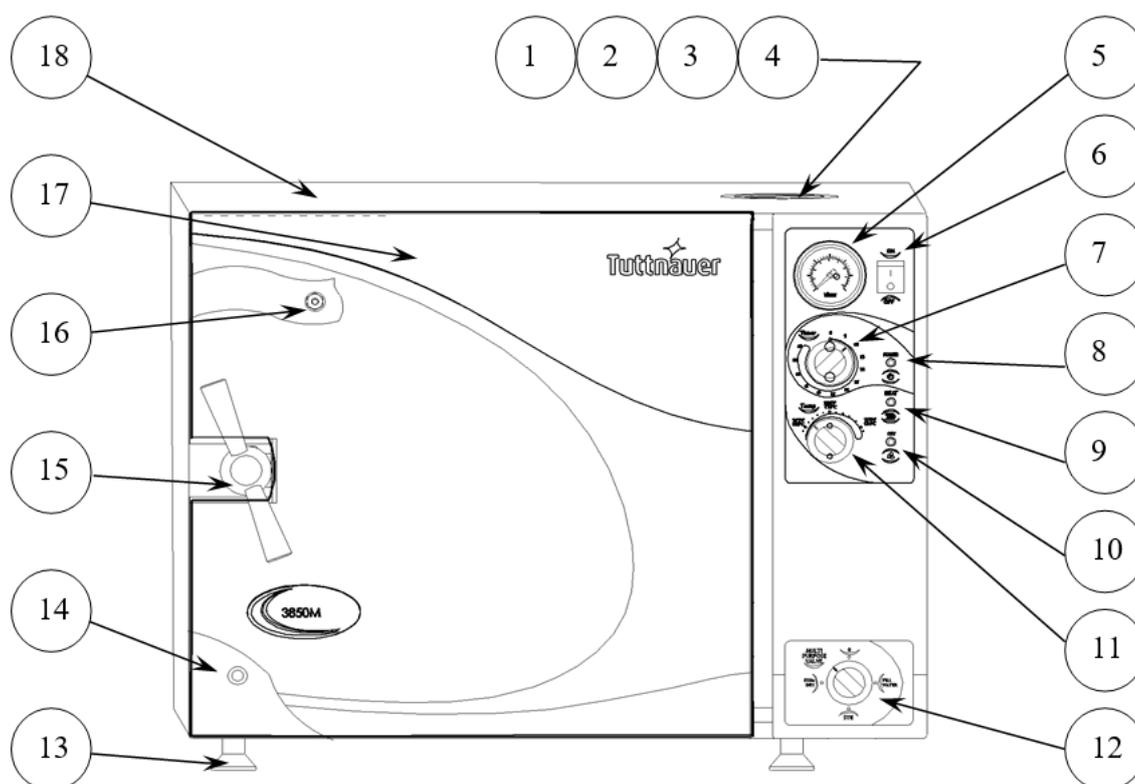
### 3.3 Front View - 3140 M



No.	Description	No.	Description
1	Water reservoir cover	10	Dry indicator light
2	Water reservoir	11	Thermostat (B10) knob
3	Safety valve	12	Multipurpose valve
4	Air trap jet	13	Front legs

No.	Description	No.	Description
5	Pressure Gauge	14	Reservoir water drain valve
6	Main power switch	15	Door closing device
7	Timer	16	Door microswitch
8	Power indicator light	17	Door cover
9	Heat indicator light	18	Autoclave cover

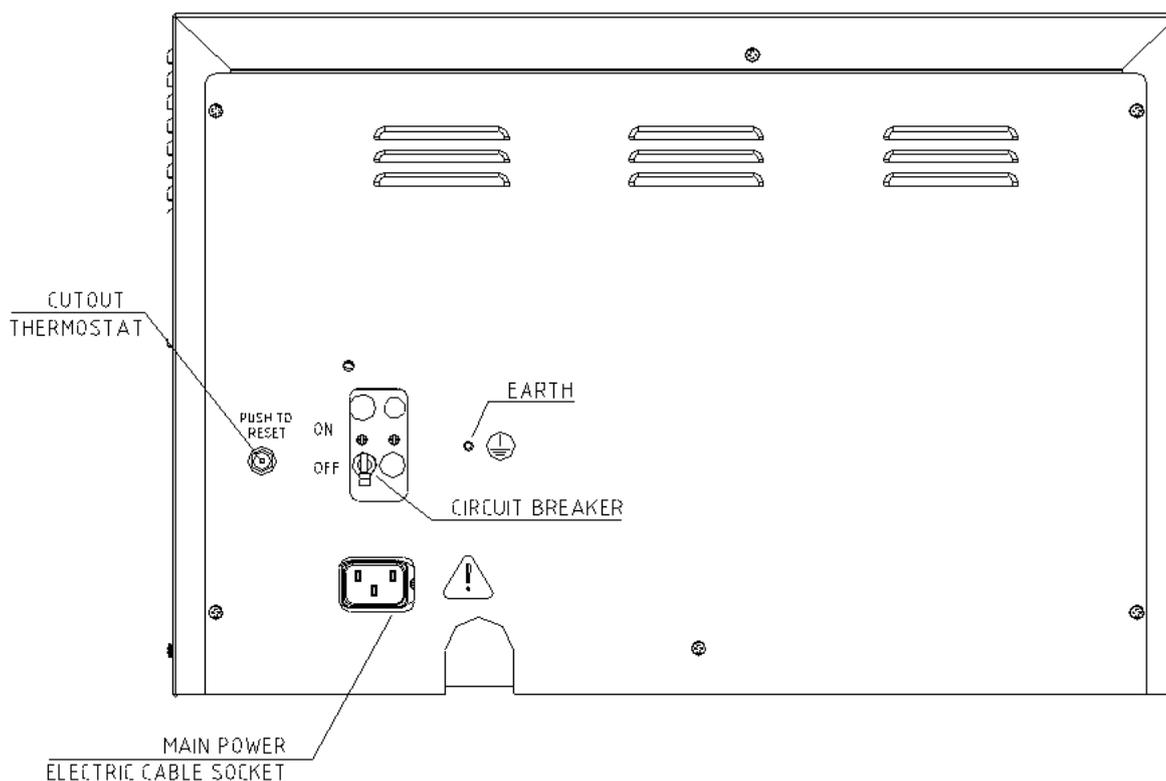
### 3.4 Front View - 3850/3870 M



No.	Description	No.	Description
1	Water reservoir cover	10	Dry indicator light
2	Water reservoir	11	Thermostat (B10) knob
3	Safety valve	12	Multipurpose valve

No.	Description	No.	Description
4	Air trap jet	13	Front legs
5	Pressure Gauge	14	Reservoir water drain valve
6	Main power switch	15	Door closing device
7	Timer	16	Door microswitch
8	Power indicator light	17	Door cover
9	Heat indicator light	18	Autoclave cover

### 3.5 Rear View



**Warning!**

**Mind the Power Socket. Keep it and its vicinity dry. Danger of electrocution.**

## 4. Installation Instructions

### Warnings!

- Only technical personnel having proper qualifications and holding technical documentation (including a Technical Manual), and adequate information are authorized to install and serve the apparatus.
- Before moving the autoclave, make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber.
- Mind the power socket. Keep it and its vicinity dry. Danger of electrocution.
- If applicable: Before moving the autoclave, make sure that the electric cord is disconnected from the power, and there is no pressure in the chamber.
- Drain the water from the reservoir.
- Do not drop the device!
- To avoid injuries, lifting and carrying should be done with at least two persons or by using a fork-lift or any other mechanical aid.
- For devices that weigh less than 75 Kg: The device is not designed for use on any standard slide out shelf. If it is necessary to use a slide out shelf, it must be tested and / or rated for 75 Kg or more.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.

### 4.1 Operating Conditions

The equipment is intended to work withing NORMAL environment conditions as follows:

Pollution:	Pollution Degree 2
Altitude:	Maximum altitude 2000 meters (6561.68 ft) above sea level
Ambient Pressure:	80 – 105 kPa (11.6 – 15.2 psi)
Room Temperature:	5 – 40 °C (41 – 104 °F).
Humidity:	Up to 80%.
Mains supply fluctuations:	Up to +/-10% of the nominal voltage.
Installation Category II.	

- This device is to be used for indoor use.
- Insufficient space for ventilation may result in malfunction or damage due to overheating.

## 4.2 Storage

The packed or unpacked autoclave shall be stored in “indoor conditions” (protected from rain and water).

## 4.3 Utilities

Utilities	Unit	Value
Power supply (as appropriate)	V-A	1ph, 120V – 16A,50/60 Hz
	V-A	1ph, 230V – 16A,50/60 Hz

## **Warnings!**

In order to avoid any injury by electrical hazard, it is recommended that a ground fault protection device (GFCI) be installed in the electrical panel feeding the autoclave (local codes may make this mandatory). The electrical network must comply with local rules and regulations. Verify that there is an easy access to the main power switch and to the current leakage safety relay (GFCI). The voltage supplied to the device must comply with the label  $\pm 10\%$ . Check and verify that the electrical net is protected by a current leakage safety relay.

### 4.3.1 **Waste Water Disposal**

## **Caution!**

Waste water must be brought into the public water piping in accordance with the local rules or requirements, i.e. only non-hazardous liquids may be disposed in public sewage!

## **4.4 Electrical**

The electrical connection should comply with the devices power requirement. It must also comply with local installation and safety rules and regulations. The voltage supplied to the device must comply with the label  $\pm 5\%$ .

To avoid any injury by electrical hazard, it is mandatory for the customer to have installed an earth leakage relay (GFI outlet or circuit breaker) in the electrical circuit to which the autoclave is connected. This relay disconnects all the poles of the electrical power line in case of accidental contact with the autoclave's metal enclosure, by the operator or another person, leading to a dangerous leakage current.

Connect the power cord to the socket on the rear side of the autoclave; plug it into the supply outlet. The autoclave must be connected to a properly grounded outlet.

## **4.5 Setup**

Proper adjustment of the chamber pitch is one of the most important things you can do for the sterilizer. Proper chamber pitch insures that among other things, the sterilizer will have the proper amount of water in the chamber at the beginning of each cycle. Insufficient water in the chamber, at the beginning of the cycle, will cause the unit to overheat and activate one of the safety thermostats. This will occur at some point during the cycle when the water level becomes too low. If, on the other hand, there is too much water in the chamber, this will extend the heating portion of the cycle. Extending the heat up time will shorten the sterilization time, causing items to not be sterilized, indicator strips to not change color and spore tests to fail.

- The autoclave should be turned off and unplugged.
- Make sure the counter is level and sturdy.
- Make sure all the feet are on the autoclave and none have been lost.
- Make sure the feet are free to move in and out.
- Position the autoclave on the counter.
- Fill the reservoir with distilled water.
- The chamber should be empty of any instruments, trays, or leftover water.
- The chamber pitch now needs to be adjusted.
- Measure to the proper amount of distilled water for the appropriate model unit as listed below.

Model	Water Quantity	
	oz	ml
1730	10-12	300-350
2340/2540	12-15	350-450
3140	14-16	420-480
3850	20-23	600-690
3870	24-27	720-810

- Pour the proper amount of water into the chamber through the front door of the unit.
- This water should cover the bottom of the chamber to within +/- 1/2 inch of the groove in the front.
- If necessary, adjust the front leveling feet so that the water lays in the chamber correctly.
- Once the chamber pitch adjustment is completed, the unit is ready to operate.

#### 4.6 Construction

The main parts of the autoclave are made of materials as indicated below:

- Chamber is built of electro-polished stainless steel 316 L.
- Door is made of stainless steel CF8.
- Trays are made of stainless steel 304.
- Door handle is made of hard plastic material that is safe to touch and thermo-insulated.
- Water reservoir is made of hard plastic material.

## 5. Pre-sterilization Cleaning and Disinfection of Instruments and their Loading into the Device

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The purpose of packaging and wrapping items for sterilization is to provide an effective barrier against contamination during storage once the items have been sterilized.



**Attention! When sterilizing cotton wool or pads, it is essential to wrap them in paper or cotton bags to prevent the multi-purpose valve and the autoclave openings from becoming clogged with remnants of the material.**

Packaging and wrapping materials should be approved for use in a steam sterilizer and permit the removal of air and penetration of the steam during the sterilization process.

The basic principle of determining the size, mass and contents of instrument and hollowware packs is that the contents are sterile and dry immediately upon completion of the drying cycle.

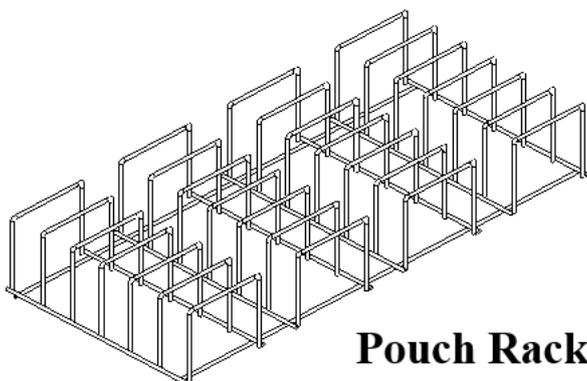
Instruments to be sterilized must be clean and free from any residual matter, such as debris, blood, pads or any other material. Such substances may cause damage to the instruments themselves or the sterilizer.

- Clean instruments immediately after use. It is recommended that instruments be ultrasonically cleaned in a Tuttnauer™ Clean and Simple Ultrasonic Cleaner, using Tuttnauer™ Clean and Simple enzymatic cleaning solution.
- After ultrasonic cleaning, rinse under tap water for 30 seconds and pat or air dry. If your tap water has a high mineral content, rinse a second time in a bath of distilled water and pat dry with a cloth towel to remove residual minerals.
- Launder textile wraps prior to reuse, but do not use bleach.
- Follow the instrument manufacturer's instructions for cleaning and lubricating instruments.
- Be sure that instruments of dissimilar metal (stainless steel, carbon steel, etc.) are separated. Carbon steel instruments should be bagged or placed on autoclavable towels and not directly on stainless steel trays. (Mixing will result in the oxidation of these metals).
- Load items within the boundaries of the tray so that they do not touch the chamber walls or fall off when the tray is inserted into the autoclave. The chamber walls are very hot; items that come into contact with the wall can be damaged
- Check the manufacturer's instructions as to the proper procedure for sterilizing each item. The instrument manufacturer can give specific information on proper sterilization temperature and sterilization time for any item.
- Place a sterilization indicator in each tray or inside each wrapped pack.
- When using a paper / plastic bag, Tuttnauer recommends the use of a Tuttnauer Pouch Rack. If a pouch rack is not available, then Tuttnauer recommends placing the paper side down on the tray. Use single-use wraps once only and discard after use.
- Verify that the packaging method is in accordance with good practice approach and the packaging materials are in accordance with the applicable standards (e.g., EN868 series).
- At least once per week use a biological spore test (*Bacillus Stearothermophilus*) in any load to insure proper sterilization. (Be aware testing standards may vary).
- All instruments must be sterilized in an open position. Place instruments with ratchets opened and unlocked or clipped on the first ratchet position. Surfaces that are hidden because the item is in a

closed position will not be exposed to the steam and will not be sterilized.



- Disassemble or sufficiently loosen multiple-part instruments prior to packaging to permit the sterilizing agent to come into contact with all parts of the instrument.
- Make sure that all instruments remain apart during the sterilization process. Surfaces that are hidden because items are covering other items will not be exposed to the steam and will not be sterilized.
- Items prone to trapping air or moisture, e.g., hollowware, should be tilted on edge. This will allow a minimal resistance to the removal of air or condensate during sterilization and drying.
- The operator may use racks to allow for adequate separation of packaged instruments.
- Do not overload the sterilizer trays. Overloading will cause inadequate sterilization and poor drying. Load trays loosely to capacity. Instruments should be loaded one level deep only. See table in section 2 for recommended loading capacities.
- Tubing should be rinsed after cleaning. When placed in the tray, make sure that both ends of the tubing are open and there are no sharp bends or twists.
- Empty canisters should be placed upside-down, to prevent accumulation of water.
- Allow a distance of approximately 1" (2.5 cm) between trays or cassettes to permit steam circulation.
- Wrapped instruments should be packed in material which will allow steam penetration and promote drying, such as autoclave bag, autoclave paper, or muslin towels.
- **Do not stack pouches.**  
It is recommended that a Tuttnauer™ Pouch Rack be used. This will allow the operator to place pouches on their side, which will increase capacity and will allow for better exposure to steam for sterilization and better circulation of air for drying.



- If spotting is detected on the instruments, the first step would be to use an ordinary eraser to remove the spot. If there is no pitting under the spot, the spot was only dirt. Dirt spots on an

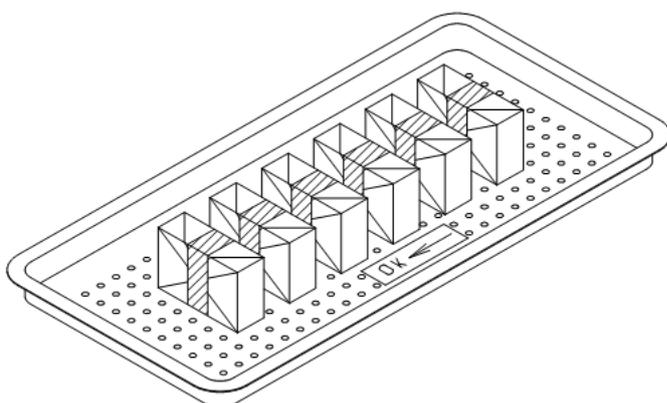
instrument may be an indication that the autoclave needs to be cleaned or that the instruments were not adequately cleaned or dried. If removal of the spot reveals pitting, the spot was most likely rust. Rust spots on an instrument are not uncommon on inexpensive instruments. It may also be an indication that the instruments were rinsed in tap water with a high content of minerals. These minerals when exposed to high temperature and steam will accelerate the oxidation of the metal. One suggestion would be to final rinse the instruments in distilled water.

- If the instruments exhibit a discoloration, this can be due to the mixing of carbon steel and stainless steel. When these two metals come into contact with each other electrolysis occurs that breaks down the metal. The best solution is to separately wrap the carbon steel to insulate it from other instruments or the trays.

## Packs



**Attention! When sterilizing cotton wool or pads, it is essential to wrap them in paper or cotton bags to prevent the multi-purpose valve and the autoclave openings from becoming clogged with remnants of the material.**

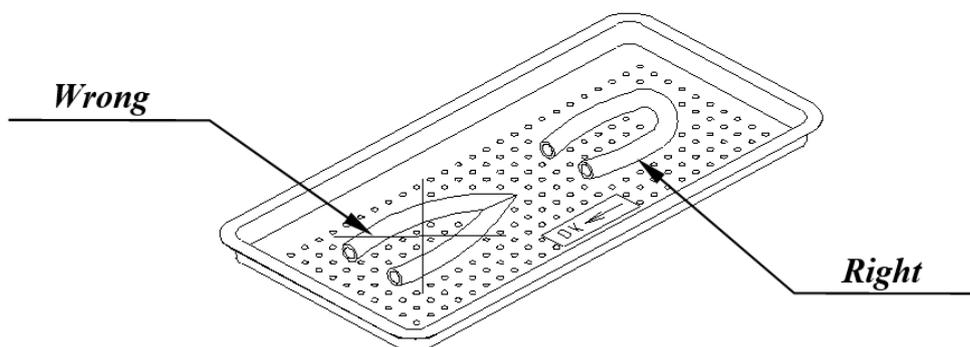


- Place packs upright on trays, side by side.
- Packs should not touch the chamber walls.
- Pack instrument sets in a manner that prevents damage to delicate items.
- Pack hollowware sets so that all openings face the same direction and so that the contents cannot move inside the pack.
- Load packs of folded operating room drapes with layers vertical, allowing air to be removed from the packs rapidly.
- Do not place packs of hollowware and trays of instruments above textile packs or soft goods to avoid wetting caused by condensation from items above.
- Load items packed in flexible packaging materials on edge with paper to laminate, or flat with the plastic surface downwards.

**Note: The instrument manufacturer's recommendations shall be observed, concerning the sterilization data for each type of material.**

## Tubing

- When placing in a tray, make sure that both ends are open, without sharp bends or twists.



## Cassettes

- Instruments may be sterilized in cassettes. The advantage of the cassettes is that the sterilized instruments may remain organized in the cassettes ready for use, while stored in a sterile area.
- If using models 2340 / 2540, remove the trays and slide the cassettes into the chamber on the rack system.
- If using models 3850 / 3870, place the cassettes directly on the tray, either lying flat (but no stacking) or on edge.

## 6. Initial Operating Instructions

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### Warnings!

- The autoclave is intended for indoor use only.
- Do not operate the autoclave in the presence of dangerous gases and vapors.
- If applicable: The Emergency Stop Push-Button in cooperative with key lock mounted on the front panel switches OFF the autoclave operation.
- If applicable: When the emergency switch is activated, the key must be used to allow the switch to return to the operating position.
- If applicable: It is strictly forbidden for any person to enter the autoclave's chamber. If, for any reason (cleaning, maintenance, or if something falls down), it is necessary to enter the chamber, the person must shut the system by actuating the emergency switch and withdrawing the key from the system, keeping the key on him, and shut OFF all utilities (steam, water, compressed air, and electricity), to prevent accidents and injuries. It is also necessary to turn off the air supply.
- Waste water should be brought into the public net in accordance with the local rules or requirements i.e. **ONLY NON-HAZARDOUS LIQUIDS SHALL BE DISPOSED IN PUBLIC SEWAGE!**
- Never reuse waste water.
- Water droplets and visible signs of moisture on sterile packaging or the tape used to secure it, may compromise the sterility of processed loads, or be indicative of a sterilization process failure. Visually check the outside wrapper for dryness. If there are water droplets or visible moisture on the exterior package or on the tape used to secure it, the pack or instrument tray is considered unacceptable.
- The sterility of the instruments processed in unwrapped cycles cannot be maintained if exposed to non-sterile environment.
- Reset the Atmospheric Pressure prior to operating the autoclave for the first time.
- If applicable: In the beginning of each day, check the water level in the reservoir.
- If applicable: Before filling the reservoir, verify that the autoclave is idle and there is no pressure in the chamber.
- Custom programs require validation by the user!
- After the cycle, open the door slowly to allow steam to escape and wait 20 seconds before removing the load.
- For manual operating doors: Before opening the door, verify that there is no pressure in the chamber. Open the door slowly to allow steam to escape, and wait 5 minutes before removing the load.
- To avoid severe injuries from hot steam and condensed hot water that may drip out when opening the door, it is strictly forbidden to lean on the autoclave, and to place your hand or any part of your body over or under the door.
- During loading and unloading, use safety gloves and glasses in accordance with local safety regulations and good practice. If applicable: Do not remove the top cover during a running cycle. Hot water / steam may exit!

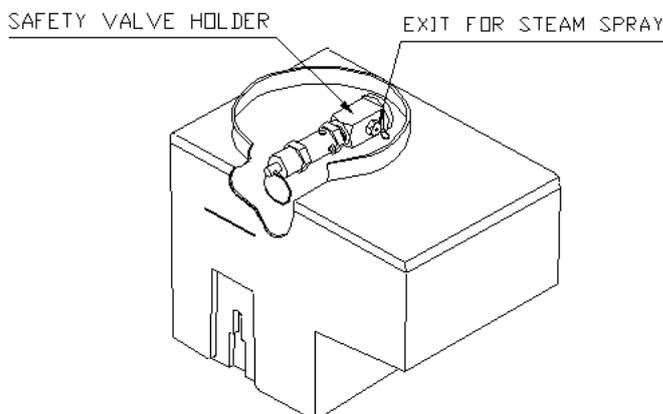
- If carts are applicable: It is strictly forbidden to load or unload the loading cart if the transfer carriage is not connected by the hooks to the autoclave and the brakes are not applied.
- On closing the autoclave door, make sure that it is properly locked before starting a cycle.
- Don't place your hand or head, etc. above/beside/below or close to the door while opening it as hot steam is escaping the chamber.
- Do not stand near the back panel of the autoclave while the device is operating as the pressure safety valve may release steam.
- Do not touch hot surfaces, such as the top enclosure and area adjacent to the chamber opening! Hot surfaces are indicated with a label.

## 6.1 Filling Water

1. Ensure that the drain valve is in a CLOSED position.
2. Remove the water reservoir cover.
3. Pour distilled water into the reservoir through the opening on top of the autoclave, until it reaches the base of the safety valve holder. Under no circumstances fill any higher than the base of the safety valve holder.
4. For proper operation make sure the water level is above the coils of the cooling coil.

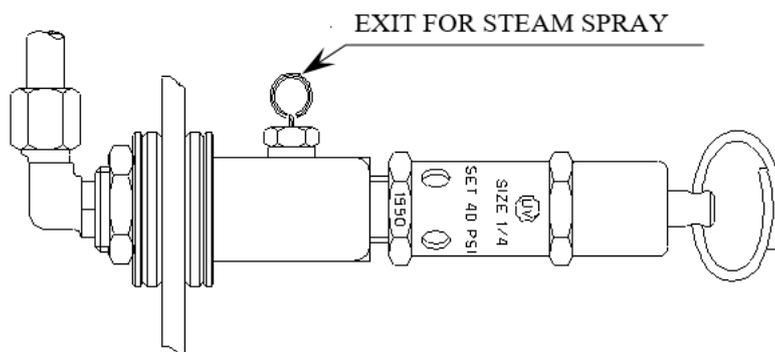


**Caution! Under no circumstance should water be filled above the safety valve holder.**



5. **USE DISTILLED WATER ONLY.** Use water having characteristics as per the Water Quality table. The impurities in tap water will create the need for more frequent cleaning and maintenance, in addition, they will accumulate and block the hole of the Air Jet. This will prevent the temperature in the chamber from rising properly. This will cause spore tests to fail and indicator strips will not change color. It is essential from time to time, during heating and sterilization phases, that a spray of steam should escape, from the Air Jet, causing a hissing sound. If no escaping steam is evident

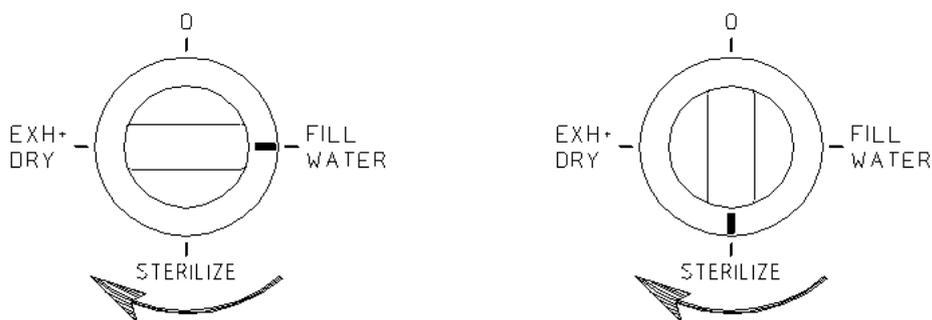
or no hissing sound heard.



**Caution! Daily before operation, check the water level in the reservoir and add water when required. Once a week or after 20 cycles (the shorter period) replace the water in the reservoir.**

6. Move the ON / OFF rocker switch, located on the front panel, to the ON position. The green Power Light will turn on, indicating that power is ready to be supplied to the Heating Elements.
7. Turn the red tracking needle on the pressure gauge counterclockwise to 0 psi. The tracking needle will indicate the highest pressure reached during the cycle.
8. Open the front door of the autoclave and set the Multi-purpose valve knob to the FILL WATER position.
  - The water will now flow into the chamber.
  - The water should cover the bottom of the chamber up to the groove in the front. This amount of water should be in accordance with the table in sec 1.12.
  - When the water reaches the mark at the front of the autoclave, set the multi-purpose valve knob to the STERILIZE position.

**Note: When used for the first time, the multi-purpose valve requires slight effort, but with use it will turn smoothly and easily.**



**Caution! The multi-purpose valve knob should be turned in a clockwise direction only!**

9. Load the autoclave. See section "Pre-sterilization cleaning and loading" for information on proper loading.

10. Shut the door, move the Door Closing Device into position and tighten, making sure that the Door Switch is activated.

**Note: Due to the inherent elasticity of the door gasket, it is important to tighten the door bolt until “hand tight”. Do not overtighten the bolt as this may result in damage to the gasket.**

**Should the autoclave fail to reach the sterilizing temperature/pressure, always check first that the door is fully sealed. If not, tighten the door bolt further, as described above, until completely sealed.**

11. Turn the Thermostat knob to the desired sterilization temperature.

**Note: This autoclave is designed according to all international standards, which allows the temperature to raise 4°F (2°C) over the working temperature.**

## 7. Control Panel

Description		Operation
Pressure Gauge		0-60 psi, (0-4bar) indicates the chamber pressure and includes maximum point indicator.
Timer 0-60 min.		Sets the time for sterilization and drying cycles. <b>Note:</b> The power to the heating elements is switched off when the Timer reaches 0 minutes.
Thermostat		Sets the desired sterilization temperature for each cycle within the range of 212°F - 273°F (100°C - 134°C).
Multi-purpose valve	Position	
	Fill water	Water flows from the water reservoir into the chamber.
	Sterilize	Valve closed to all directions.
	EXH. & Dry	Exhausts the steam from the chamber into the water reservoir after the sterilization cycle is finished.
	"0"	Heating elements are disconnected, no cycle is in progress.
Heat Indicator light		Lights to indicate that the heaters are activated. It will cycle off and on when the temperature reaches the preset value. <b>Please note:</b> The heat light may also appear dim in the drying stage.
Dry Indicator light		Lights to indicate that drying cycle is in process.
Power Indicator light		Light to indicate that the main switch is on.
Main Switch		Main power switch, which supplies electric power to the autoclave.
Water drain valve		Enables the drainage of water from the reservoir.
Water reservoir		Holds water for sterilization and serves as a condenser for the hot steam during the exhaust phase.
Safety valve		Located in the water reservoir. Protects the chamber by releasing any pressure above 40psi (2.7bar). This Safety Valve is required and approved by ASME.

Description	Operation
Air trap jet	Located in the water reservoir. Eliminates air during heat up phase to ensure correct sterilization temperature is reached. Also prevents air pockets and pockets of cold steam from forming in the chamber.
Safety thermostat	Prevents overheating during the sterilization and drying stages, will automatically reset itself.
Cut-out thermostat	Cuts off the power in case of overheating if the safety thermostat does not operate. This thermostat does not reconnect automatically but must be reset.

## 7.1 Sterilization Programs

Material	STE. Temp	Total Sterilization Time (does not include drying)				Models
		MK		M		
		Cold Start	Hot Start	Cold Start	Hot Start	
a. Unwrapped instruments, open glass or metal containers and any other items where such temperature is suitable	273°F (134°C)	16 min	11 min	-	-	1730
		21 min	11 min	27 min	13 min	2340
				30 min	14 min	2540
				32 min	23 min	3140 3850 3870
Single instruments		12 min	9 min			
b. Wrapped instruments, standard cassettes, rubber tubing and any other items where such temperature is suitable	273°F (134°C)	20 min	15 min	-	-	1730
		25 min	15 min	31 min	17 min	2340
				34 min	18 min	2540
				36 min	27 min	3140 3850 3870

c. Packs and any other items where such temp. is suitable	273°F (134°C)	25 min	20 min	45 min	35 min	All models
d. Any items where a lower sterilization temp. is required	250°F (121°C)	30 min	25 min	60 min	50 min	All models

**Note: The table shows different times for M (Standard Model) & MK (Kwiklave Manual) units as well as for hot and cold starts.**

**Make sure you are using the correct times for your model machine.**

**A hot start is any cycle that has begun within 1 hour from the previous cycle ending (including drying time).**

**These sterilization times are based on the unit being supplied the correct voltage, as indicated on the Technical Label attached to the outer cabinet. If the voltage supplied is substantially less than the indicated voltage, additional time must be added to each cycle.**

1. Set the Timer to the desired sterilization cycle time according to the Sterilization Time Table.
  - The Heat Light will come on, indicating that power is being supplied to the Heating Elements and remain on until the correct sterilization pressure is achieved.
  - Once the correct pressure is reached the Heat Light will cycle on and off, indicating that the Heating Elements are turning on and off to maintain the correct sterilization pressure.
  - When the Timer reaches 0 min, the Heating Elements are turned off and a buzzer will sound indicating that the sterilization cycle is complete.
  
2. If unwrapped instruments were sterilized and no drying is required, follow these steps.
  - Once the Timer has reached 0 min, turn the Multi-purpose valve knob promptly to the Exhaust / Dry position. This will allow the steam and leftover water to return to the reservoir.
  - When the white needle on the pressure gauge has reached
  - 0 psi, the door can be opened.
  - Unscrew the Door Closing Device, move it to the side and open the door to remove the instruments.
  - Now turn the Multi-purpose valve knob to the “0” or off position.

**Note: The sterility of instruments processed in unwrapped cycles cannot be maintained if exposed to a non-sterile environment.**
  
3. If wrapped instruments were sterilized and drying is required, follow these steps.
  - Once the Timer has reached 0 min, turn the Multi-purpose valve knob promptly to the Exhaust / Dry position. This will allow the steam and leftover water to return to the reservoir. Do not allow the pressure to drop below 10 psi before beginning this procedure. This will cause water to remain in the bottom of the chamber even after the Multi-purpose valve has been turned to Exh / Dry. Resetting the Timer for drying will only be heating up this water and not drying the instruments.

- If the pressure has dropped below 10 psi, leave the unit in the STERILIZE position, leave the door closed and locked. Now reset the Timer for 10 minutes.
- When the Timer reaches 0 min, the pressure should be above 10 psi (if not, add 5 more minutes to the Timer). Now turn the Multi-purpose valve to the Exh / Dry position. This will ensure that all the water has been returned to the reservoir.

**Note: The sooner the Multi-purpose valve is turned to Exh / Dry at the end of the sterilization cycle, the more effective and efficient will be the drying.**

- When the white needle on the pressure gauge has reached 0 psi the door can be opened.
- Unscrew the Door Closing Device as far as it will go, but do not move it to the side, this will allow the door to open about  $\frac{3}{4}$  of an inch.
- Leave the Multi-purpose valve knob in the Exhaust / Dry position.
- Reset the Timer for drying, 20 – 30 minutes, the Dry Light will come on indicating that Drying is active, and the Heating Elements are back on.
- When the Timer reaches 0 min., the drying is complete, and the Dry Light and Heating Elements will turn off.
- Unscrew the Door Closing Device, move it to the side and open the door to remove the instruments.
- Now turn the multi-purpose valve knob to the "0" or off position.



**Warning! The multi-purpose valve knob should be turned in a clockwise direction only.**

4. At the end of the day, turn the ON / OFF rocker switch to the OFF position.

## 8. Maintenance Instructions

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### 8.1 Preventive and Scheduled Maintenance

The maintenance operations described in this chapter need to be followed as indicated to keep the device in good working condition.

The instructions that follow can easily be carried out by the office personnel and do not require a service technician.

Should the need arise, technical assistance or a service technician can be requested by either calling your dealer or Tuttnauer USA.

**Note: Where daily maintenance is indicated this would only pertain to days the equipment is in use.**

Where weekly and monthly maintenance is indicated it is based on usage of 20 cycles per week or 80 cycles per month. Where usage is less than that, counting cycles rather than calendar days is an acceptable substitute.



**Caution! Make sure the autoclave is not hot before cleaning.**

### 8.2 Daily Maintenance

Clean the door gasket with a mild detergent, water and a soft cloth or sponge. The gasket should be clean and smooth.

### 8.3 Weekly Maintenance

1. **ONCE PER WEEK**, clean the air jet. To ensure that the temperature inside the chamber rises properly it is necessary to keep the air jet clean. A dirty air jet will prevent indicator strips from changing color and cause spore tests to fail. See section 8.6 [Cleaning Air Jet](#) .
2. Once per week clean and descale the chamber, copper tubes and the reservoir using **Chamber Brite** (see section 8.10 ).
3. Take out the tray holder and trays. Clean the tray holder and trays with detergent or a non-abrasive stainless-steel cleaner and water, using a cloth or sponge. Rinse the tray holder and trays immediately with water to avoid staining the metal.



**Caution:** Do not use steel wool, steel brush or bleach as this can damage the chamber and trays!

4. Put a few drops of oil on the 2 door pins and door tightening bolt.
5. Clean the outer parts of the autoclave with a soft cloth.

### 8.4 Periodic Maintenance

1. Once every month clean and check the safety valve.
2. Replace the door gasket every 12 months, or as needed (see section 8.7 [Replacing the Door Gasket](#) ).

3. Once a year inspect the locking device for excessive wear.
4. Once a year check the door axis bushing for tear and wear and replace if worn out.

## 8.5 Draining the Reservoir

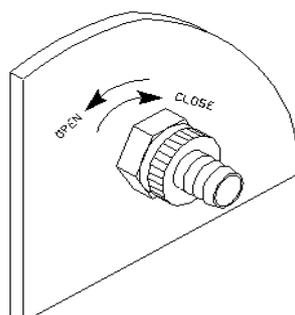


### Warnings!

- Before starting, make sure that the electric cord is disconnected and there is no pressure in the autoclave.
- Never reuse waste water.
- Waste water should be brought into the public net in accordance with the local rules or requirements i.e. **ONLY NON-HAZARDOUS LIQUIDS SHALL BE DISPOSED IN PUBLIC SEWAGE!**

The drain valve is located on the front left side of the autoclave after the door is opened. The function of the drain valve is to drain the water reservoir.

1. Connect the silicone hose, supplied with the autoclave, to drain into a bucket.
2. Turn drain valve counterclockwise to the open position.
3. Fully drain the reservoir.
4. With a quart of tap water flush out the reservoir.
5. Turn drain valve clockwise to the close position.
6. Connect the electric cord to power source.
7. Fill the reservoir with distilled water to just below the safety valve (see section 6.1 [Filling Water](#)).
8. Turn on the main power switch.
9. The autoclave is now ready for use.



## 8.6 Cleaning Air Jet

(Located in the water reservoir.)



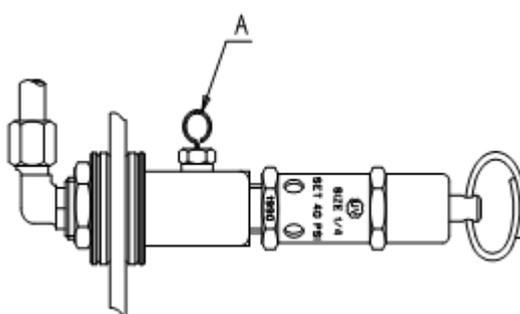
**A dirty air jet is the number one cause of failed spore tests.**

The elimination of air from the sterilization chamber during heat up is critical to the proper operation of the autoclave. Failure of the air removal system will be responsible for incomplete sterilization, indicator strips that do not turn, failed spore tests and aborted sterilization cycles. A clogged air jet will result in receiving the error message “Low Heat”.

The air jet consists of a small orifice with a clean out wire inserted in it (wire is permanently installed and will not come out). It is required that the air jet be cleaned once per week or more often, if necessary, to remove any accumulated dirt and debris.

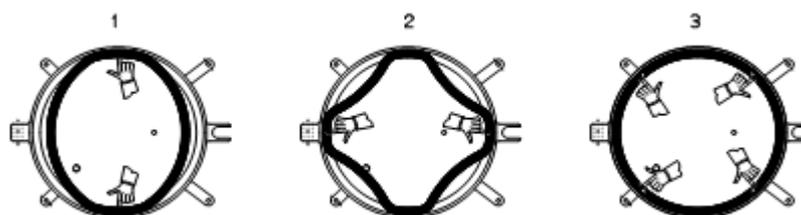
It is preferred to clean the air jet when the unit is running a cycle and under pressure. This is so that any loosened debris will be blown away, however, it can be done while the unit is idle.

1. Remove the water reservoir cover.
2. Clean the hole of the jet by manipulating the air trap wire back and forth 10 times.



**Note:** It is important to clean the hole of the air trap, as described at point 2 before starting operation of the autoclave, for the first time.

## 8.7 Replacing the Door Gasket



1. Pull off the gasket from the door groove.
2. Install the new gasket as described in drawings 1, 2 and 3 above.



This gasket is designed with a trapezoidal cross section. The gasket should be placed with the widest side towards the door.

## 8.8 Checking the Safety Valve

(Located in the water reservoir)

To prevent the safety valve from becoming blocked, it is necessary to allow the steam pressure to escape through the valve. This procedure should be done every month as follows:

1. Operate the sterilization cycle according to the manual.
2. Allow a pressure of approximately 30 psi (260 kpa) to build up in the chamber.
3. Turn the timer back to 0 minutes.
4. Remove the water reservoir cover.

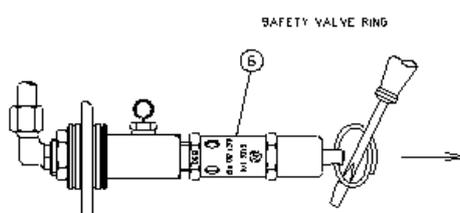


**Caution!**

**This next step will expose you to HOT STEAM.**

**To avoid being burned by hot steam, do not place your face over the safety valve.**

5. Pull the ring of the safety valve using a tool, i.e., screwdriver, hook, etc. and open the safety valve for 2 seconds, then release. Be careful not to burn your hands.
6. Verify that the valve releases steam and closes immediately.
7. If the safety valve is stuck in the "open" position, let the pressure decrease to zero (atmospheric pressure).
8. After the pressure in the chamber decreases to zero, pull the valve ring to release the valve.
9. Repeat operations 1-6.
10. If the valve is stuck again in the open position, call for service.
11. After a successful check, turn the multi-purpose valve to the Exh/Dry position.
12. Wait until pressure decreases to zero, only then can the door be opened.



## 8.9 Unclogging the Multi-Purpose Valve or Fill Piping

1. Pour distilled water into the chamber, according to quantities mentioned in para. 4 (Installation Instructions).
2. Close the door.
3. Turn the multi-purpose valve to STERILIZE position.
4. Move the main switch to the ON position.
5. Turn the Thermostat knob to 273°F (134°C).
6. Turn the Timer knob to 20 minutes.
7. After the timer has reached "0" turn the multi-purpose valve (clockwise) to the FILL WATER position, do not stop at any other position.

In most cases, the pressure pushes the obstructing substance out and the steam exhausts into the water reservoir.

8. When the pressure gauge reaches 0, turn the multi-purpose valve to the "0" position, and the main switch to OFF.
9. Open the door.
10. Replace the water in the water reservoir.  
The autoclave is ready for the next cycle.
11. If this procedure does not clear up the clogging, a technician will be required to replace the multi-purpose valve or clear the piping.



**Attention! When sterilizing cotton wool or pads, it is essential to wrap them in paper or cotton bags to prevent the multi-purpose valve and the autoclave openings from becoming clogged with remnants of the material.**

### **8.10 Cleaning the Tabletop Autoclaves with Chamber Brite™**

CHAMBER BRITE is a cleaning and descaling agent designed specifically for cleaning and removal of water deposit oxides and other sediments that are found in steam sterilizers.

The material is a combination of acidic salts and additional cleaning materials. Chamber Brite is not for use on the Elara11 or any other pre/post vac autoclave. Use two packets of CHAMBER BRITE in Models 2840/3850/3870. Use half of a packet on all Model 1730 sterilizers. All other models use one packet.

Clean every 20 cycles or as needed.

#### **Cleaning procedure:**

**Important: all steps in this procedure must be completed without interruption.**

1. When autoclave chamber is cold, remove instruments, trays, and tray holders from the autoclave. The tray rack is easily removed by squeezing it in on both sides while sliding it out of the autoclave. It also protects the chamber from scratching.
2. Place trays and tray holder in the sink to be cleaned with a stainless steel SAFE cleaner.
3. Fill water reservoir with distilled water.
4. Open the chamber door and spread the contents of a tablet in a straight even line along the bottom of the cold chamber, from front to rear.
5. Run a standard unwrapped cycle at 273°F (134°C) with no drying stage according to the manufacturer's instructions. All cycles referenced are from a COLD start. When the cycle is finished, exhaust the unit.
6. At the end of the exhaust stage drain the water from the reservoir.  
**Important: Do not open Chamber until the completion of step #6**
7. Refill the water reservoir with distilled water.
8. Repeat steps 5 and 6, but without using Chamber Brite.
9. Turn the autoclave off and allow chamber to cool.
10. Wipe the interior of the chamber with a damp cloth.

11. Refill the reservoir with distilled water only.
12. Turn the “Fill” knob to the fill position and allow a small amount of water (4 ounces) to enter the chamber.
13. Remove this water from the chamber.
14. The autoclave is ready for use.

**IMPORTANT: Do not sterilize instruments during the cleaning process!!!**

**Caution:** Keep out of reach of children. Contains mildly acidic ingredients. Avoid contact with the skin, eyes or clothing. Wash hands well after touching the tablet. In the case of eye contact flush with continuous running water for at least 15 minutes. If irritation persists, get medical attention. If accidentally swallowed, do not induce vomiting, drink large amounts of water and obtain medical attention. MSDS available upon request.

To purchase more Chamber Brite, please contact your local dealer.

## 9. Troubleshooting

This troubleshooting chart enables the user to solve minor malfunctions, prior to requesting service.

Only technical personnel having proper qualifications and holding technical documentation (including a technician manual) and adequate information are authorized to service the apparatus.

Symptom	Possible Cause Checkup and Tests	Corrections
<p>1. Power indicator light does not light up when the ON / OFF switch is in the ON position.</p>	<p>1.1 The unit is not plugged in, or the wall outlet has no power.            1.2 Circuit breaker is tripped.            1.3 Cut out thermostat is tripped.            1.4 Turn the multi-purpose valve to the “Exh/Dry” position and set the timer to 15 minutes. If the “Dry” light is on, the “Power” light is burned out. When finished, turn the timer back to 0 minutes.            1.5 If the “Dry” light does not come on, there is an internal electrical problem.</p>	<p>1.1 Make sure the power cord is plugged into the wall outlet and the back of the unit or restore power to the wall outlet.            1.2 Reset the circuit breaker.            1.3 Reset the cut out thermostat.            1.4 Have a technician replace the “Power” light.            1.5 Have a technician checkout the unit.</p>
<p>2. Heat indicator light does not light up at the beginning of the sterile cycle. The Power light is on and the unit does heat up.</p>	<p>2.1 The “Heat” light is burned out.</p>	<p>2.1 Have a technician replace the “Heat” light.</p>
<p>3. Heat indicator light does not light up at the beginning of the sterile cycle. The Power light is on and the unit does NOT heat up.</p>	<p>3.1 The multi-purpose valve is not in the STERILIZE position.            3.2 The door is not closed tightly.            3.3 The door switch activator is missing or not adjusted correctly.            3.4 The timer is off.            3.5 There is an internal problem.</p>	<p>3.1 Turn the multi-purpose valve to the STERILIZE position.            3.2 Close the door tightly.            3.3 Replace or readjust the door switch activator. When adjusting – turn the activator screw, in or out, by ¼ turn until the door microswitch is pushed in when the door is closed.            3.4 Turn the timer on.            3.5 Have a technician checkout the unit.</p>

Symptom	Possible Cause Checkup and Tests	Corrections
<p>4. Dry indicator light does not light up at the beginning of the dry cycle. The Power light is on and the unit does heat up.</p>	<p>4.1 The “Dry” light is burned out.</p>	<p>4.1 Have a technician replace the “Dry” light.</p>
<p>5. Dry indicator light does not light up at the beginning of the dry cycle. The Power light is on and the unit does NOT heat up.</p>	<p>5.1 The multi-purpose valve is not in the DRY position. 5.2 The timer is off. 5.3 There is an internal problem.</p>	<p>5.1 Turn the multi-purpose valve to the DRY position. 5.2 Turn the timer on. 5.3 Have a technician check out the unit.</p>
<p>6. Water does not enter the Chamber when the multi-purpose valve is in the FILL WATER position.</p>	<p>6.1 There is no water in the reservoir. 6.2 The multi-purpose valve is clogged. 6.3 The fill piping is clogged.</p>	<p>6.1 Fill the reservoir with distilled water. 6.2 Follow the instructions in para. 7.6 to unclog the valve. 6.3 Follow the instructions in para. 7.6 to unclog the piping.</p>
<p>7. Spore tests are failing or indicator strips are not changing color according to instructions of indicator's manufacturer.</p>	<p>7.1 Air jet is clogged. 7.2 Unit may be overloaded. 7.3 The load may be too densely packed. 7.4 Sterilization time may not be correct. 7.5 Unit not reaching the correct sterilization pressure reading on the gauge.</p>	<p>7.1 Clean the air jet, see para. 8.6 7.2 Adjust loading according to "Maximum Load Sizes" table in sec. 1.10.5. 7.3 Items to be sterilized should be separated and not stacked. See preparations for sterilization para. 5. A Tuttnauer Pouch Rack is recommended 7.4 Check table para 7.1. 7.5 See para. 7.1 unit does not reach the proper operating pressure”.</p>
<p>8. Wrapped or bagged items do not dry.</p>	<p>8.1 The unit is not being vented immediately after the sterile cycle. 8.2 Units may be overloaded. 8.3 The load may be too densely</p>	<p>8.1 Once the timer rings at the end of the sterile cycle, immediately turn the multi-purpose valve to the “Exh / Dry” position. Once venting is complete, start the drying cycle.</p>

Symptom	Possible Cause Checkup and Tests	Corrections
	<p>packed.</p> <p>8.4 Units may not be heating properly.</p>	<p>8.2 Adjust loading according to "Maximum Load Sizes" table in sec. 1.10.5.</p> <p>8.3 Items to be sterilized should be separated and not stacked. See preparations for sterilization para. 5. A Tuttnauer Pouch Rack is recommended.</p> <p>8.4 Have a technician check the unit.</p>
<p>9. Unit does not reach the proper operating pressure.</p>	<p>9.1 Unit is not getting the correct voltage.</p> <p>9.2 Chamber was not filled with the correct amount of water.</p> <p>9.3 Door gasket is leaking steam.</p> <p>9.4 Steam is leaking at the closing device.</p> <p>9.5 Safety Valve is leaking.</p> <p>9.6 Items being sterilized are absorbing all available steam (cloth towels or gowns).</p> <p>9.7 Heat light goes out before correct pressure is reached.</p> <p>9.8 One or more of the heating elements is bad.</p>	<p>9.1 Check table 1.10.6 for correct operating voltages.</p> <p>9.2 Check section 4.1 for correct operating procedures. See sec. 4 for installation instructions.</p> <p>9.3 Tighten the door more, if leaking persists, replace the door gasket.</p> <p>9.4 Door bellows is leaking, have a technician replace the bellows.</p> <p>9.5 Follow procedure in section 7.1. If leaking persists have technician replace the Safety valve.</p> <p>9.6 Sterilize fewer towels or gowns or adjust the front of the unit higher to allow more water into the chamber. See installation instructions section 4. /maximum load table section 1.10.5.</p> <p>9.7 Unit may be out of calibration or there is an internal steam leak. Have a technician check the unit.</p> <p>9.8 Have a technician check the unit.</p>
<p>10. Items in the chamber are burning or melting.</p>	<p>10.1 Chamber was not filled with the correct amount of water.</p>	<p>10.1 Check section 6 for correct operating procedures. See sec. 4</p>

Symptom	Possible Cause Checkup and Tests	Corrections
	<p>10.2 Items are lying up against the chamber.</p> <p>10.3 The sterilization time is set too high.</p> <p>10.4 Items being sterilized are absorbing all available steam (cloth towels or gowns).</p> <p>10.5 Door gasket is leaking steam.</p> <p>10.6 Steam is leaking at the closing device.</p> <p>10.7 Safety Valve is leaking.</p> <p>10.8 There is an internal steam leak or electrical problem.</p>	<p>for installation instructions.</p> <p>10.2 Make sure no items are touching the walls of the chamber.</p> <p>10.3 Set the sterilization time according to the table in section 7.1.</p> <p>10.4 Sterilize fewer towels or gowns or adjust the front of the unit higher to allow more water into the chamber. See installation instructions section 4. /maximum load table section 1.10.5.</p> <p>10.5 Tighten the door more. If leaking persists, replace the door gasket.</p> <p>10.6 Door bellows is leaking, have a technician replace the bellows.</p> <p>10.7 Follow procedure in section 7.5. If leaking persists have technician replace the Safety valve.</p> <p>10.8 Have a technician check the machine.</p>
<p>11. Closing device does not open when pressure gauge reads 0 psi.</p>	<p>11.1 Door bellow locking pin is trapped.</p>	<p>11.1 Follow instruction in section 8.</p>
<p>12. Closing device is hard to close.</p>	<p>12.1 Closing device needs oil.</p>	<p>12.1 Apply 1 or 2 drops of 3 in 1 oil or some white lithium grease to the screw and bearing of the closing device, see sec 8.</p>
<p>13. Water is left in the bottom of the chamber at the end of sterilization.</p>	<p>13.1 Water level too high in the reservoir.</p> <p>13.2 Waiting too long to exhaust after sterilization is complete.</p>	<p>13.1 Do not fill above the safety valve. See sec 8.8.</p> <p>13.2 If unwrapped instruments are being sterilized, this is not a problem.</p> <p>For wrapped instruments see sec 7.</p>

Symptom	Possible Cause Checkup and Tests	Corrections
14. Water spills on the floor when the door is open.	14.1 Leaving the multi-purpose valve in the “Exh/Dry” position while leaving the door closed and having a cooling coil that is mispositioned in the reservoir.	14.1 Once the chamber is finished venting, open the door right away. Also, straighten the cooling coil in the reservoir. The open end of the cooling coil should not be below the water line.
15. Cut out thermostat trips.	15.1 The unit has detected an overheating condition due to too little water in the chamber caused by either: a) Incorrectly filling the chamber at the beginning of the cycle. b) A leaking door seal. c) A leaking safety valve. d) Absorbent material being sterilized. e) An internal steam leak.	15.1 Correct the cause and reset the Cut out thermostat; if the problem persists have a technician check the machine. a) Check section 6 for correct operating procedures. See sec. 4 for installation instructions. b) Tighten the door more; if leaking persists, replace the door gasket. c) Follow procedure in section 8.8. If leaking persists, have technician replace the Safety valve. d) Sterilize fewer towels or gowns or adjust the front of the unit higher to allow more water into the chamber. See installation instructions section 4. /maximum load table section 1.10.5. e) Have a technician check the machine.
16. Circuit breaker trips.	16.1 A power surge or spike.	16.1 Reset the red lever of the circuit breaker to the up position. If the problem persists, have a technician check the unit.
17. Reservoir does not drain.	17.1 Drain valve is clogged.	17.1 Open drain valve completely and blow compressed air into the valve. This should blow the clog back into the reservoir where it can

Symptom	Possible Cause Checkup and Tests	Corrections
		be removed. Cover the reservoir opening to avoid splatter.
18. Drain valve is leaking.	18.1 Debris is stopping the valve from seating properly. 18.2 Drain valve o-rings are worn.	18.1 Open drain valve completely and blow compressed air into the valve. This should blow the clog back into the reservoir where it can be removed. Cover the reservoir opening to avoid splatter. 18.2 Have a technician replace the o-rings.
19. Chamber is black or dirty looking.	19.1 Unit has not been cleaned recently.	19.1 Follow cleaning instructions using Chamber Brite, section 8.10.
20. Chamber has a water mark along bottom.	20.1 Not using distilled water. 20.2 Unit has not been cleaned recently.	20.1 Use 100% steam distilled water. 20.2 Follow cleaning instructions using Chamber Brite, section 8.10.
21. Steam escaping from the closing device area.	21.1 The door bellows is leaking.	21.1 Have a technician replace the door bellows.
22. Steam leaking from the door seal.	22.1 Door may not be tightened down enough. 22.2 Door gasket may be worn or cracked.	22.1 Tighten the door more. 22.2 Replace the door gasket (see sec. 8.7).
23. Multi-purpose valve turns backwards.	23.1 The internal spring in the multi-purpose valve has broken.	23.1 Have a technician replace the multi-purpose valve.
24. Multi-purpose valve does not turn.	24.1 Poor maintenance will result in the multi-purpose valve binding.	24.1 Have a technician replace the multi-purpose valve.
25. Red tracking needle on pressure gauge is hard to set.	25.1 No lubrication on the needle shaft. 25.2 Internal spring is too tight.	25.1 Place one drop of oil between the silver knob and the glass of the gauge. Turn the knob back and forth to work the oil onto the internal shaft. 25.2 Use a small screwdriver to

Symptom	Possible Cause Checkup and Tests	Corrections
		adjust the small screw in the center of the silver knob.
26. Timer does not time down.	26.1 Internal gearing has worn down.	26.1 Have a technician replace the timer.
27. Timer bell does not ring.	27.1 The hammer on the timer bell has broken off. 27.2 Timer was not turned far enough to set hammer	27.1 Have a technician replace the timer. 27.2 Timer must be turned past 10 minutes to set hammer.
28. Safety valve is leaking.	28.1 Debris has lodged in the seat of the safety valve.	28.1 Follow the instructions in sec 8.8.
29. Instruments are rusting.	29.1 The first step is to determine if it is rust or dirt.	29.1 Follow instructions in sec 8
30. Door will not open, closing device is open.	30.1 Unit was left to cool with the door closed and a vacuum developed.	30.1 Make sure pressure gauge reads 0 psi, and then pull on the ring of the safety valve. This will relieve the vacuum in the chamber.
31. Door handle cannot be turned counter-clockwise for the door to be opened and there is no pressure in the chamber.	31.1 Locking pin is trapped.	31.1 1. a. Turn the Multi-purpose valve to EXH. & DRY. b. Turn the handle of the Door Closing Device ¼ of a turn in the clockwise (closing direction). The pin will be released, enabling the operator to open the door. 2. If this does not correct the problem, a Technician will need to be called
32. Wrapped or bagged instruments are not drying properly (see also sec 7).	32.1 Bagged instruments are placed too close to each other. 32.2 Cycle ending has not been performed correctly.	32.1 a. A Tuttnauer Pouch Rack is recommended to provide proper spacing of bagged instruments. This will allow for better exposure to steam for sterilization and better circulation

Symptom	Possible Cause Checkup and Tests	Corrections
		<p>of air for drying.</p> <p>b. If a Pouch Rack is not used, make sure the instruments on the tray are only one level deep and that the paper / plastic bags are plastic side down.</p> <p>32.2 End cycle according to para. 7.</p>

