STANDARD CONFIGURATION SUMMARY

- Chamber volume from 85 liters
- Working pressure meets ASME and PED requirements
- Working at pressures of 0-325 kPa absolute
- Temperature range 105 °C (221 °F) to 138 °C (280 °F)
- User friendly control system with multi-color display
- Up to 30 cycle programs (preset programs according to selected options)
- USB and Ethernet communication ports
- Independent pressure gauge in front panel (not for 28xx model)
- 316L stainless steel chamber
- Two PT100 sensors
- Conforms to PED 97/23 EEC
- Conforms to standards: ASME, UL
- Company Quality System Compliance with ISO 9001:2008 and ISO 13485:2003

OPTIONAL FEATURES SUMMARY (RED INCLUDED)

- Fast Cooling by cooling coil (not for 2840 EL-D)
- Super-Fast cooling by fan and cooling coil (not for 2840 EL-D)
- Vacuum pump for pre-vacuum air removal and post-vacuum moisture removal for fast drying
- F_0 control for sensitive loads
- Independent built-in steam generator
- Disinfection/Isothermal cycle 60°C (140°F) to 94°C (201°F)
- Warming Cycle 95°C (203°F) to 104°C (219°F)
- Biohazard system with a 0.2µm biological filter for decontaminating discharged air from the sterilizer
- Built-in printer
- External Independent Recorder
- User remote monitoring
- Advanced reporting system
- IQ, OQ, PQ
- Special Cycles for material testing

PRODUCT DESCRIPTION

This autoclave series is designed to be highly customizable in order to cover a large range of applications for laboratories, research institutes and biotechnology facilities.

The autoclave series has a chamber volume range from 28 liters to 160 liters. The autoclave is heated by a heating plate on the outer chamber wall for Bench-top or heating element inside the chamber for Vertical. Optionally the autoclave can be equipped with a steam generator. All models have a temperature range from 105 °C (221 °F) to 138 °C (280°F) and a working pressure that meets ASME and PED requirements.

APPLICATIONS

Laboratory
Research Institutes
Biotech Facilities
Food laboratories
Material Stress Testing
Laboratory QA
Pharmaceutical Laboratory

DEVICE PICTURE

2840EL-D Benchtop Autoclave

2840ELV-D Vertical Autoclave

Information provided by Tuttnauer is believed to be accurate and reliable. However, no responsibility is assumed by Tuttnauer for its use.

This specification is subject to change without notice.

PRODUCT SPECIFICATION

CHAMBER VOLUME & SIZE

MODEL	CHAMBER DIMENSIONS		VOLUME (liter)
	Diameter ø (mm)	Depth (mm)	
2840 EL-D	280	400	28
2840 ELV-D	280	460	31
3840 EL-D 3840 ELV-D	380	400	52
3850 EL-D 3850 ELV-D	380	500	65
3870 EL-D 3870 ELV-D	380	690	85
5050 EL-D 5050 ELV-D	500	500	110
5075 EL-D 5075 ELV-D	500	750	160

ELECTRICAL SAFETY AND COMPONENTS

All components are safety approved and certified by national and international organizations like UL, CE and others.

LANGUAGE

The operator display is available in the following 26 languages:

Bulgarian
Chinese
Croatian
Czech
Dutch
Danish
English
Estonian
French
Georgian
German
Greek
Hungarian
Korean
Latvian
Lithuanian
Polish
Portuguese
Romanian
Russian
Serbian
Slovakian
Spanish
Swedish
Thai
Turkish
Vietnam

STANDARDS AND CODES

Our high quality laboratory autoclaves are designed to comply with the strictest international directives and standards.

Directives & Guidelines:
Pressure Equipment Directive – PED 97/23 EEC
EMC Directive 89/336 EEC
RoHS Directives – 2002/96 EEC
Low Voltage Directive 73/23 EEC
Machine Directive 2006/42

Standards:
DIN 58951-2:2003 Steam Sterilizers for Laboratory use
ASME Code, Section VIII, Division 1, Unfired Pressure Vessels
EN 13445:2009 for Pressure Vessels
EN 14222:2003 for Stainless Steel Shell Boilers
EN 13060 (only Annex C) - Water Quality

Safety and EMC Standards:
IEC/UL/EN 61010-1, IEC 61010-2-040, EN 61326

Good Practice Standards:
ISO 17665-1 and ST79

Quality System Compliance:
ISO 9001:2008 (Quality Systems)
ISO 13485:2003 (Quality Systems for Medical Devices)

CHAMBER CONSTRUCTION

Materials
The sterilizer chamber is constructed from solid, high quality materials.

Chamber
Standard Chamber Material: 316Ti

Design Pressure
Chamber is designed for 2.8 Bar(a)/142°C.

Door Gasket
A silicone gasket is permanently fixed in the door.

Surface Treatment
A passivation layer is applied to the internal surface through an electro-chemical treatment which results in a smooth and shiny stainless steel surface. The surface is polished to a Ra value < 0.8 µm which is highly protective against corrosion.

CHAMBER HEATING

Standard
Benchtop autoclave: is heated by a heating plate on the outer chamber wall.
Vertical autoclave: is heated by an immersed heating element inside the chamber at the bottom.

Optional Advanced Heating (Steam Generator)
An integrated steam generator and a coiled pipe around the outer chamber wall can be used for heating benchtop or vertical autoclaves.

Insulation
The autoclave chamber is completely insulated with a chloride free glass wool thereby keeping the autoclave cool on the outside. The insulation reduces the energy consumption by keeping the heat inside the chamber.

SAFETY FEATURES

Door Safety Systems

The laboratory autoclaves are designed with a number of independent mechanical and electronic safety features.

- A safety device prevents the operator from opening the door when the chamber is pressurized
- Steam will not to enter the chamber when the door is open
- A cycle cannot start if the door is open or not properly locked
- The controller will not allow the door to be unlocked until liquid temperature reaches the predetermined end temperature
- The controller will not allow the door to be opened until chamber pressure reaches room pressure

General Safety Features

- Safety Valves: The chamber is equipped with safety valves – if the pressure exceeds the allowed limit the safety valves will discharge.

- Built-in Steam Generator Safety: A water level monitoring system maintains a constant water level and ensures safe operation of the heaters.

VALVES

The piping system of the autoclave uses electrical solenoid valves to control the condensate and steam flow in and out of the chamber, to control the vacuum, and to control the air inlet valve.

VALIDATION PORT

The chamber is provided with a threaded connection for optional vacuum/pressure gauges and test sensors.

WATER RING VACUUM PUMP

Prevacuum Air Removal & Post vacuum Moisture Removal

The optional vacuum pump effectively removes up to 99% air and moisture from the chamber. The pump is mounted on a shock absorber (damping mechanism) to minimize vibration. For model 2840EL pre & post vacuum is achieved with a membrane pump.

FAST LIQUID COOLING (OPTION)

Importance of Cooling - The chamber construction includes internal water coils (for benchtop autoclave) and external water coils (for vertical autoclave) which rapidly reduce the liquid temperature by the injection of cold water into these coils. This option is particularly useful for sterilizing sensitive liquid loads requiring reduced heat exposure time.

Cooling Process - Fast cooling is achieved by replacing steam with compressed air to equalize pressure and passing water through the cooling coils thereby reducing cooling time by as much as 75%. This results in safe cooling preventing breaking, deforming, damaging loads and reducing high temperature exposure time. Also, more sterilization cycles per day can be performed.

The installation site must include a separate compressed air utility to operate the cooling system.

SUPER FAST LIQUID COOLING (OPTION)

In addition to fast cooling, an optional fan can be applied to further circulate the compressed air in the chamber. This speeds up the heat exchange during the cooling stage in order to safely achieve super-fast cooling of the liquid load under pressure. This can reduce cycle time up to 90% and minimizes load exposure to high temperatures

Water and Air supply for all Fast Cooling Options

Water supply required for superfast cooling: 2 to 3 Bar pressure with a ½" diameter pipe.

Compresses air required for superfast cooling: 6 to 8 bar pressure with a ½" diameter pipe.

DRYING OPTIONS

Active Drying with Post Vacuum

For benchtop autoclaves, an optional vacuum pump can be used for post vacuum drying, at the end of the sterilization cycle, ensuring improved drying of porous loads and hollow instruments such as pipette tips. The benchtop autoclave is equipped with a heating plate attached under the chamber that heats the chamber during the drying phase. The low pressure in the autoclave chamber, caused by the vacuum, reduces the boiling temperature forcing moisture to evaporate rapidly. The vapour is then removed from the chamber by vacuum resulting in a dry load.

Complete Drying with Chamber Heating and Post Vacuum

Highly efficient drying is achieved by uniformly heating the chamber wall of the benchtop or vertical autoclave. This is achieved by heating the chamber from steam passed through a coiled pipe around the chamber. The post vacuum stage reduces the boiling point which speeds up drying. This results in fast and complete drying, and guarantees that even the most difficult loads such as textiles, porous loads, hollow instruments and tips, will dry.

PREVACUUM CYCLE (OPTION)

The prevacuum cycle is a fast and effective cycle for removing more than 99% of the air from the chamber in order to ensure good steam penetration and fast heating up.

BIO-HAZARD SYSTEM OPTION (OPTION)

Tuttnauer's Bio-Hazard system provides an effluent sterilization cycle. Prior to sterilization, during the air removal stage, all effluent is passed through a 0.2µm biological filter that filters the exhaust air. During the sterilization phase, condensate does not leave the autoclave chamber where it is sterilized during the cycle together with the biological filter. After sterilization the sterilized effluent is cooled to a safe temperature before being discharged to drain.

F_0 CONTROL OPTION (OPTION)

F_0 control enables reduced media exposure to high temperatures thereby reducing cycle time and preventing damage to temperature sensitive media. Provisions are made to control the sterilization process by insertion of a temperature sensor (PT100) in the load. The exposure time measure is calculated using algorithm based software from the time the temperature sensor in the load has reached a predetermined set point until the end of the heat up stage. The F_0 value is recorded in the sterilization printout after the cycle completes.

GRAVITY CYCLE
Non-porous goods, liquids and media in closed vented glass containers are suitable to be sterilized by a gravity cycle. The gravity cycle uses the gravity air displacement principle.

DISINFECTION/ISOTHERMAL CYCLE (OPTION)
This cycle is designed to enable disinfection ("low" temperature isothermal treatment) typically used for preparing agar and other biological media. The temperature range setting is flexible within 60°C (140°F) to 94°C (201°F).

WARMING CYCLE (OPTION)
The warming cycle has a temperature range from 95°C (203°F) to 104°C (219°F).

TWO PT100 SENSORS
Two flexible PT100 temperature sensors inside the chamber are provided to monitor load temperature for sensitive liquid loads which require precise temperature and heat exposure control.

Safety is an important concern. Safety is ensured by using two PT100's to compare liquid temperatures between liquids in two vessels. If the temperature is different then it means a glass vessel may have broken.

Furthermore, two PT100s ensure glass vessels of different volumes in the chamber are sterilized and reach specified end temperature.

VACUUM SYSTEM AND DRAIN COOLING WATER QUALITY
City tap water supply:
- Hardness between 0.7 and 2 mmol/ℓ
- The tap water pressure should be in the range of 2 – 5 bar (30 - 72 psi)
- Recommended temperature: 15°C

WATER CONSUMPTION OF MINERAL FREE WATER PER CYCLE

Model	EL-D / ELC-D (Liters)	ELV-D / ELVC-D (Liters)
2840	0.8	3
3840	1.4	8
3850	1.5	8
3870	2	8
5050	3	20
5075	5	20

STEAM SUPPLY OPTION
Steam Generator
The optional independent built-in steam generator supplies steam for the sterilization process. The stainless steel steam generator is an electrically heated type generator equipped with immersion heaters.

The section "Electrical Specifications" provides detailed information about the electrical requirements for the autoclave when using an internal steam generator.

Water Source for Steam Generator
Water to the steam generator is supplied by a single-phase pump which is connected to de-mineralized water source or RO water source.

Steam Generator Water Quality
Various water systems can be used to supply mineral-free water to the steam generator such as Reverse Osmosis (RO), distilled water, etc. Water supplied to the steam generator should be in compliance with the EN 13060 (only Annex C) standard which includes the following hardness and conductivity requirements:

- Hardness (∑ Ions of alkaline earth) < 0.02 mmol/l
- Conductivity < 15 µS/cm (at 20 °C)

Note: Soft water should not be used since its use may result in corrosion of the steam generator and chamber.

CONTROL SYSTEM
The main board controls and monitors the physical parameters of the sterilization process and performs the operation sequence of the machine, according to a user selected program, and includes the following features:

- F_0 software control (optional)
- PID (Proportional Integral Differential) pressure control
- Digital inputs and outputs for sterilizer control
- Analog inputs for control and reading temperature and pressure
- A USB port for external devices and an optional barcode feature. Direct connection to an internal thermal printer. An Ethernet communication port.
- Measures chamber pressure and steam generator pressure
- FLASH memory and real-time clock backup store cycle data for the last 100 cycles even if there is a power failure
- In/Out test
- Filter replacement notification based on number of cycles

The control system controls all system functions, monitors system operations, visually alerts the operator of cycle malfunctions and, on demand, provides visual indication of the chamber temperature and pressure.

TEMPERATURE AND PRESSURE SENSORS

The temperature and pressure measuring circuits are both linear and designed with components having a high precision. The PT100 sensors conform to Class A of the IEC751 standard (ISO/EN 61010-2-040).

The control system allows for the calibration of temperature and pressure to be performed digitally.

Each sensor circuit is calibrated with individual constants to correct the deviation in manufacturing and aging.

The system uses FLASH memory in which the offset and gain data of the sensors are stored. This data may be entered into the system, through programming or through the autoclave control panel.

CONTROL PANEL

Control and Monitoring

The control system is operated via the Bacsoft fully automated menu driven panel, consolidated into a 3 button circuit, allowing the user to easily operate, browse programs or set the autoclave

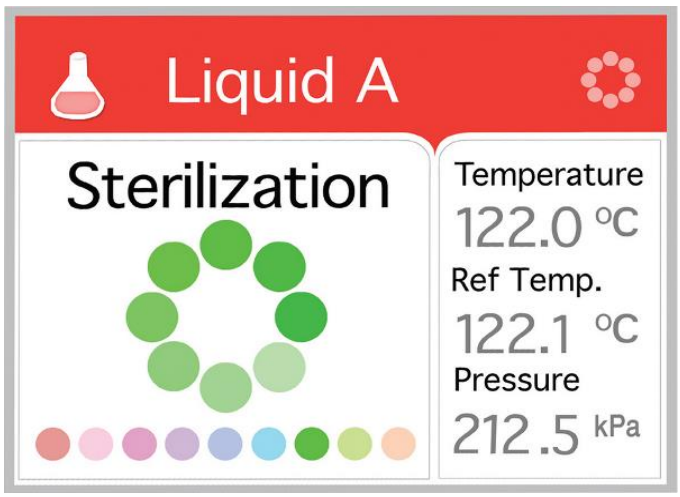
30 identification Codes and Passwords are provided to control access/operation of the machine preventing unauthorized access. These access levels are customizable. Access control can be applied to functions, such as running test cycles, setting parameters, calibration, service and maintenance, cycle selection, cycle start and door control.

With the standard factory configuration, calibration of the temperature circuits and calibration of the pressure circuits require an access code.

MULTI-COLOR DISPLAY

User interface (UI) has been designed with the following features:

- Color is used to indicate each stage of the cycle
- Quick access to important information
- Built-in view of historical cycle data
- Graphical display of temperature and pressure graphs
- Multiple languages



The following information is displayed:

- Temperature and pressure in the chamber
- Door status
- Sterilization time count down
- Autoclave status: standby, ready, pre-vacuum, heating, sterilization, exhaust, dry time, air inlet, cycle ended

ALARMS

The autoclave uses visual alarm indicators. Automatic process checking and failure detection are provided by the control system. In the event of a failure during the sterilization cycle, the system enters an alarm phase which will safely end the process automatically. The range of alarms includes:

- Temperature & pressure sensor failure
- Phase time-outs
- Door(s) not properly closed
- Power failure
- No water in the water reservoir
- Optional utility alarms: no water / no steam / no air

CYCLE DOCUMENTATION - PRINTER

The autoclave can be equipped with an optional printer which prints a detailed history of each cycle performed by the instrument. The printing format is 24 characters per line.

The following information is printed when the autoclave is turned on:

- Time & date when autoclave last turned off (powered down)
- Time & date when autoclave last turned on (powered up)

The following preliminary information and set parameters are printed when the sterilization cycle begins:

Cycle Start:
- Date
- Time
- Serial number
- Model name
- Software version
- Cycle number
- Cycle name

Sterilization Parameters
- Sterilization temperature
- Sterilization time
- End temperature
- Dry time (models with prevacuum and steam generator)

Thereafter, the autoclave starts performing the sequence of operations of the cycle. The measured values of temperature and pressure are printed at 1 minute time intervals. All interval times can be user defined. Furthermore, the customer may request customized time intervals prior to order delivery.

The data is printed beginning with the date and ending with “CYCLE ENDED” for a complete cycle or “CYCLE FAILED” for an aborted cycle.

STERILIZER DOCUMENTATION
Two copies of the manuals are provided in English. Technical manuals include electrical and piping diagram.

MAINTENANCE / SERVICE PLAN
A global network of skilled service specialists can provide periodic inspections and adjustments to help assure low-cost peak performance. A detailed service and maintenance plan is included in the operator manual.

PACKAGING FOR SHIPMENT
The sterilizer is packed in a wooden crate or rigid box for shipping/transportation.

WARRANTY
Tuttnauer warrants that each device is carefully tested, inspected and that it leaves the factory in proper working condition.

Tuttnauer certifies that the device is guaranteed to be free from defects in material and workmanship, for one year from installation date but not more than 18 months from shipping date, against faulty components and assembly. Extended warranty periods are optional.

The warranty does not include and does not replace routine treatment and preventive maintenance to be performed according to "Preventive and Periodical Maintenance" instructions mentioned in the device's accompanying manual.

The user must ensure that all utilities used, including the water, meet all the specifications mentioned in the operator manual.

The user is subject to the full warranty statement found in the documentation delivered with the equipment.

UTILITY DATA / REQUIREMENTS

Drainage (Sewage)
1. At least 1/ 2" sewage pipe.
2. The sewage shall be able to withstand continuous temperature of 80 °C. The drain/sewage system should be able to withstand 120 °C in case of malfunction.

Note: Local national regulations may require that the drain be tapped and vented, and not connected to other drains which may cause back pressure or obstruct flow. An air break may also be necessary.

Compressed Air (for fast cooling)
1. At least 1/2" hose to supply the compressed air
2. Compressed air pressure 6 – 8 Bar
3. Building compressed air supply line requires shut-off valve
3. Pressure: 6 bar, free from liquid water droplets, filtered to 25 µm, free from oil droplets greater than 2 µm

Ambient Temperature
Room temperature should be in the range from 5 to 40 °C and 85% RH (relative humidity).

Mineral-Free Feed Water for Steam Generator
Water supplied to the steam generator should have the following hardness and conductivity requirements:

- Hardness (∑ Ions of alkaline earth) < 0.02 mmol/l
- Conductivity < 15 µS/cm (at 20 °C)

1. Water intended for the steam generator must have a water quality in accordance with EN 13060 (only Annex C)
2. Install 1/2" pipe with a shut-off valve at its end
3. Regulations may require a Back-Flow protection device

Note: Soft water should <u>not</u> be used since its use may result in corrosion of the steam generator and chamber.

Tap Water
1. Intended for vacuum pump and cooling
2. Install 1/2" pipe with shut-off valve at its end
3. Supply pressure 2 – 3 bar at approximately 15 °C temperature
4. Local regulations may require a Back-Flow protection device
5. Hardness (free of alkaline earth ions) should be between 0.7 mmol/ℓ and 2.0 mmol/ℓ

ELECTRICAL SPECIFICATION

Models WITHOUT internal steam generator:

Benchtop Models

Model	Voltage V (50/60 Hz)	Phases	Power (kW)
3840 EL-D	208 / 230	1	3.2
3850 EL-D	208 / 230	1	3.2
3870 EL-D	208 / 230 / 380-400	3	4.8
5050 EL-D	208 / 230 / 380-400	3	4.8
5075 EL-D	208 / 230 / 380-400	3	6.6

Vertical Models

Model	Voltage V (50/60 Hz)	Phases	Power (kW)
3840 ELV-D	208 / 230 / 380-400	3	6
3850 ELV-D	208 / 230 / 380-400	3	6
3870 ELV-D	208 / 230 / 380-400	3	6
5050 ELV-D	208 / 230 / 380-400	3	9
5075 ELV-D	208 / 230 / 380-400	3	9

Models WITH internal steam generator:

Benchtop Models

Model	Voltage V (50/60 Hz)	Phases	Power (kW)
2840 ELG-D	208 / 230	1	2.2
3840 ELG-D	208 / 230	1	9
3850 ELG-D	208 / 230	1	9
3870 ELG-D	208 / 230 / 380-400	3	9
5050 ELG-D	208 / 230 / 380-400	3	9
5075 ELG-D	208 / 230 / 380-400	3	9

Vertical Models

Model	Voltage V (50/60 Hz)	Phases	Power (kW)
2840 ELVG-D	208 / 230	1	2.2
3840 ELVG-D	208 / 230 / 380-400	3	9
3850 ELVG-D	208 / 230 / 380-400	3	9
3870 ELVG-D	208 / 230 / 380-400	3	9
5050 ELVG-D	208 / 230 / 380-400	3	9
5075 ELVG-D	208 / 230 / 380-400	3	9

Notes:
1) With or without neutral for 3-phase supply
2) 3-phase autoclaves can be converted to 1-phase using a switch box (optional). Models 3850/70 ELV have a current consumption of 27A with a 1-phase connection. The electric current for models 5050/5075 is 40A.

EXTERNAL DIMENSIONS & WEIGHT

Models WITHOUT internal steam generator:

Benchtop Models

Model	External Dimensions W x H x D (mm)	Weight (kg)
2840 EL-D	530 x 440 x 630	51
3840 EL-D	720 x 540 x 765	110
3850 EL-D	720 x 540 x 765	120
3870 EL-D	720 x 540 x 940	120
5050 EL-D	860 x 740 x 890	290
5075 EL-D	860 x 740 x 1120	316

Vertical Models

Model	External Dimensions W x H x D (mm)	Weight (kg)
2840 ELV-D	540 x 980 x 440	115
3840 ELV-D	730 x 1000 x 540	133
3850 ELV-D	730 x 1000 x 540	136
3870 ELV-D	730 x 1000 x 540	141
5050 ELV-D	870 x 860 x 770	210
5075 ELV-D	870 x 1090 x 770	211

Models WITH internal steam generator:

Benchtop Models

Model	External Dimensions W x H x D (mm)	Weight (kg)
2840 ELCG-D	530 x 440 x 760	100
3850 ELCG-D	730 x 1366 x 1190	285
3870 ELCG-D	730 x 1366 x 1190	290
5050 ELCG-D	870 x 1578 x 1175	500
5075 ELCG-D	870 x 1578 x 1175	512

Vertical Models

Model	External Dimensions W x H x D (mm)	Weight (kg)
3840 ELVCG-D	730 x 1000 x 700	197
3850 ELVCG-D	730 x 1000 x 700	197
3870 ELVCG-D	730 x 1000 x 700	250
5050 ELVCG-D	870 x 1090 x 770	330
5075 ELVCG-D	870 x 1090 x 770	350

FLASK LOADING CAPACITY

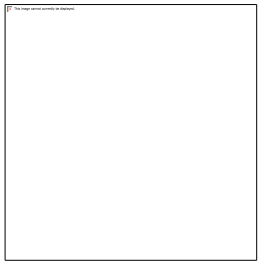
ERLENMEYER FLASKS

Vertical Models	Erlenmeyer 250ml	500ml	1000ml	2000ml	3000ml	5000ml
	Quantity of Baskets X Quantity of Erlenmeyer flasks					
2840ELV / ELVC	2 x 5	2 x 3	1 x 1	1 x 1	1 x 1	1 x 1
3840ELV / ELVC	2 x 12	1 x 8	1 x 5	1 x 2	1 x 1	1 x 1
3850ELV / ELVC	2 x 12	2 X 8	1 X 5	1 X 2	1 X 1	1 X 1
3870ELV / ELVC	3 x 12	3 X 8	2 X 5	2 X 2	2 x 1	1 X 1
5050ELV / ELVC	2 X 21	2 X 14	2 X 8	1 X 5	1 X 4	1 X 2
5075ELV / ELVC	3 X 21	3 X 14	3 X 8	2 X 5	2 X 4	1 X 2
Benchtop Models	**Erlenmeyer 250ml**	**500ml**	**1000ml**	**2000ml**	**3000ml**	**5000ml**
Bottom shelf only						
2840EL	8	4	2	None	None	None
3840EL	14	8	5	2	None	None
3850EL	18	11	7	4	2	None
3870EL	24	14	10	5	None	None
5050EL	24	15	11	6	4	2
5075EL	36	24	15	8	7	3
Benchtop Models	**Erlenmeyer 250ml**	**500ml**	**1000ml**	**2000ml**	**3000ml**	**5000ml**
Shelves System	* Optional Shelves System is not included in the Autoclave price					
	Quantity of Shelves X Quantity of Erlenmeyer flasks					
2840EL	1 x 9	1 x 4	1 x 3	None	None	None
3840EL	1 x 12	1 x 9	1 x 5	1 x 2	None	None
3850EL	1 x 17	1 x 11	1 x 6	1 x 3	None	None
3870EL	1 x 23	1 X 17	1 X 10	1 X 5	None	None
5050EL	1 x 25 1 x 16	1 X 15 1 x 12	1 X 7	1 X 4	1 X 2	1 X 2
5075EL	1 x 50 1 x 18	1 x 18 1 x 18	1 x 15	1 x 7	1 x 4	1 x 3

SCHOTT DURAN FLASKS

Vertical Models	Schott Duran 250ml	500ml	1000ml	2000ml	5000ml
	Quantity of Baskets X Quantity of Schott Duran flasks				
2840ELV / ELVC	2 x 8	2 x 5	1 x 3	1 X 1	1 X 1
3840ELV / ELVC	2 x 19	2 x 12	1 x 8	1 x 4	1 X 1
3850ELV / ELVC	2 X 19	2 X 12	1 X 8	1 X 4	1 X 1
3870ELV / ELVC	3 X 19	3 X 12	2 X 8	2 X 4	1 X 1
5050ELV / ELVC	2 X 32	2 X 21	2 X 15	1 X 8	1 X 4
5075ELV / ELVC	3 X 32	3 X 21	3 X 15	2 X 8	2 X 4
Benchtop Models	**Schott Duran 250ml**	**500ml**	**1000ml**	**2000ml**	**5000ml**
Bottom shelf only					
2840EL	10	8	4	None	None
3840EL	18	15	8	6	None
3850EL	24	17	12	7	None
3870EL	33	24	16	10	None
5050EL	35	24	15	8	4
5075EL	50	36	24	13	8
Benchtop Models	**Schott Duran 250ml**	**500ml**	**1000ml**	**2000ml**	**5000ml**
Shelves System	* Optional Shelves System is not included in the Autoclave price				
	Quantity of Shelves X Quantity of Schott Duran flasks				
2840EL	1 x 12	1 x 9	1 x 5	None	None
3840EL	1 x 20	1 x 13	z	1 x 4	None
3850EL	1 x 27	1 x 16	1 x 11	1 x 6	None
3870EL	1 x 36	1 x 23	1 x 18	1 x 9	None
5050EL	1 x 35 1 x 27	1 x 20 1 x 16	1 x 12	1 x 6	1 x 3
5075EL	1 x 55 1 x 39	1 x 32 1 x 27	1 x 20	1 x 10	1 x 5

Loading configuration example:
Loading capacity 3850 ELV-D with 2 x 19 Scott Duran 250 ml bottles



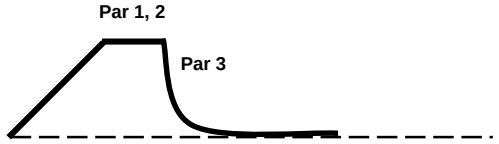
CYCLE TIMES

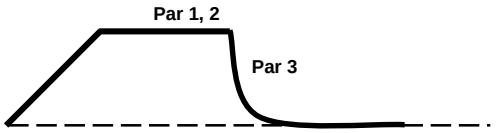
Note: Temperature measured in reference container

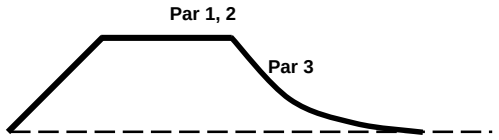
Model	Loading Capacity	Heating Time 121 ºC	Cooling Time 80ºC without Cooling	Cooling Time 80ºC with rapid cooling and Radial Fan	Cooling Time 80ºC with Rapid Cooling
Benchtop Autoclaves					
2840 EL	1 x 250 ml	22 min	52 min	-	26 min
	8 x 500 ml	29 min	138 min	-	52 min
3850 EL	1 x 500 ml	24 min	72 min	16 min	29 min
	10 x 500 ml	30 min	125 min	25 min	48 min
	8 x 2000 ml	47 min	280 min	61 min	106 min
3870 EL	10 x 1000 ml	42 min	170 min	37 min	68 min
5050 EL	20 x 1000 ml	44 min	274 min	46 min	95 min
5075 EL	15 x 2000 ml	50 min	314 min	73 min	132 min
Vertical Autoclaves					
2840 ELV	1 x 1000 ml	31 min	87 min	-	38 min
	10 x 500 ml	41 min	161 min	-	53 min
3850 ELV	12 X 500 ml	25 min	130 min	24 min	48 min
3870 ELV	6 x 1000 ml	25 min	151 min	26 min	50 min
	18 x 1000 ml	35 min	270 min	45 min	95 min
5050 ELV	6 x 2000 ml	33 min	263 min	51 min	98 min
5075 ELV	42 x 500 ml	44 min	230 min	48 min	94 min

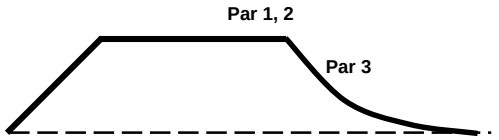
PROGRAM CYCLE DATA

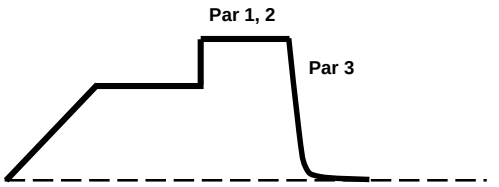
PROGRAMS 1 TO 6

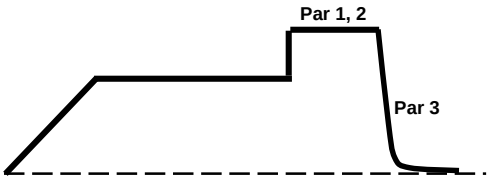
Program 1	Glass (Fast Exhaust)		
Models EL-D ELC-D ELV-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC Min **Factory Setting** 134 3 Fast
		Notes:	

Program 2	Plastic (Fast Exhaust)		
Models EL-D ELC-D ELV-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC Min **Factory Setting** 121 15 Fast
		Notes:	

Program 3	Liquid A (Slow Exhaust)		
Models EL-D ELC-D ELV-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC min **Factory Setting** 121 15 Slow
		Notes:	

Program 4	Liquids B / Waste (Slow Exhaust)		
Models EL-D ELC-D ELV-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC min **Factory Setting** 121 30 Slow
		Notes:	

Program 5	Liquid A – Fast Cooling		
Models ELC-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC min **Factory Setting** 121 15 Fast Cooling
		Notes:	

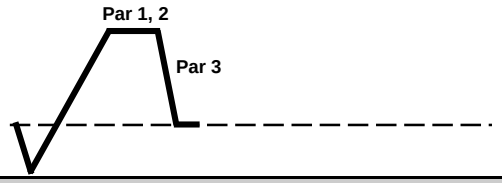
Program 6	Liquid B – Fast Cooling		
Models ELC-D ELVC-D		**Parameters** 1. Sterilization Temperature 2. Sterilization Time 3. Exhaust Mode	**Units** ºC min **Factory Setting** 121 30 Fast Cooling
		Notes:	

PROGRAMS 7 TO 12

Program 7

Models

ELC-D-PV
ELVC-D-PV
ELC-D-PVG
ELVC-D-PVG



Glass

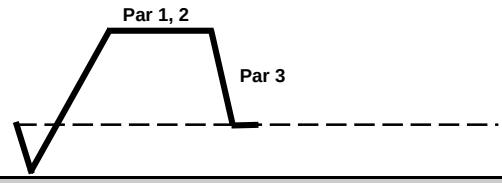
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	134
2. Sterilization Time	Min	3
3. Exhaust Mode		Fast

Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa.

Program 8

Models

EL-D-PV
ELV-D-PV
ELC-D-PV
ELVC-D-PV
ELC-D-PVG
ELVC-D-PVG



Plastic

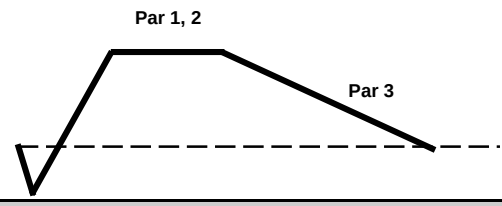
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	Min	15
3. Exhaust Mode		Fast

Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa.

Program 9

Models

EL-D-PV
ELV-D-PV
ELC-D-PV
ELVC-D-PV
EL-D-PVG
ELV-D-PVG



Liquids A: slow exhaust

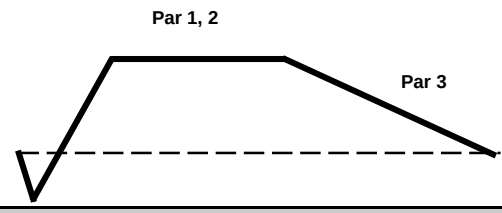
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	min	15
3. Exhaust Mode		Slow

Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa. Exhaust time is dependent on load volume and configuration of bottles/flasks.

Program 10

Models

EL-D-PV
ELV-D-PV
ELC-D-PV
ELVC-D-PV
EL-D-PVG
ELV-D-PVG



Liquids B: slow exhaust

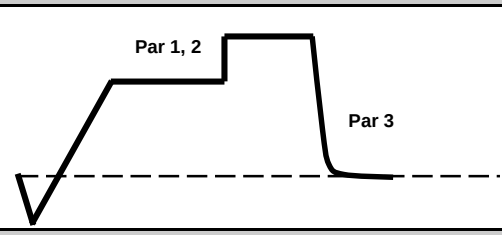
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	min	30
3. Exhaust Mode		Slow

Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa. Exhaust time is dependent on load volume and configuration of bottles/flasks.

Program 11

Models

ELC-D-PV
ELVC-D-PV
ELC-D-PVG
ELVC-D-PVG



Liquids A – Fast Cooling
Slow exhaust

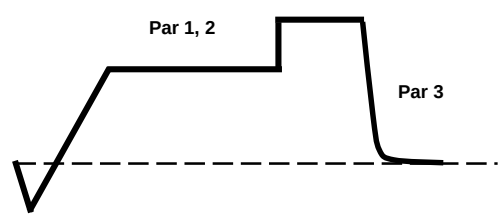
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	min	15
3. Exhaust Mode		Fast Cooling

Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa.

Program 12

Models

ELC-D-PV
ELVC-D-PV
ELC-D-PVG
ELVC-D-PVG



Liquids B – Fast Cooling
Slow exhaust

Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	min	30
3. Exhaust Mode		Fast Cooling

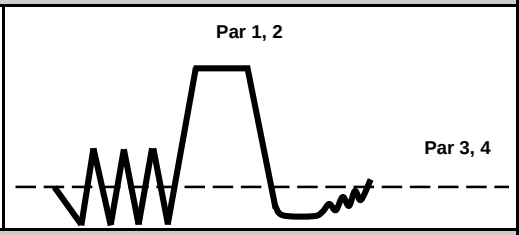
Notes:
Residual air is displaced by 1 vacuum pulses (down to 25 kPa). When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa.

PROGRAMS 13 TO 17

Program 13

Models

ELC-D-PVG
ELVC-D-PVG



Waste

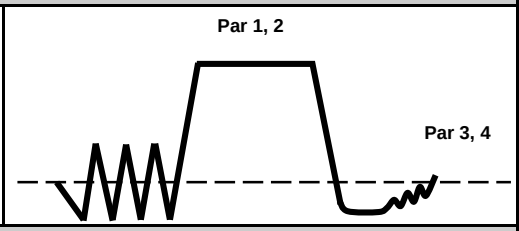
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	134
2. Sterilization Time	Min	7
3. Exhaust Mode		Fast
4. Drying Time (Post-Vacuum)	min	15

Notes:
Residual air is displaced by 4 vacuum pulses (down to 25 kPa) and 3 steam pulses up to 160 kPa. When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa. Exhausts effluents to Bio-Hazard system.

Program 14

Models

ELC-D-PVG
ELVC-D-PVG



Hollow Load

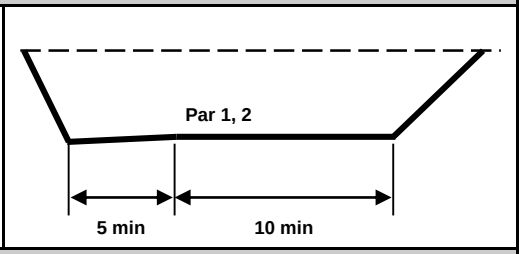
Parameters	Units	Factory Setting
1. Sterilization Temperature	ºC	121
2. Sterilization Time	min	15
3. Exhaust Mode		Fast
4. Drying Time (Post-Vacuum)	min	15

Notes:
Residual air is displaced by 4 vacuum pulses (down to 25 kPa) and 3 steam pulses up to 160 kPa. When the pressure reaches atmospheric pressure the vacuum pump is activated until the pressure drops to 25 kPa.

Program 15

Models

EL-D-PV
ELV-D-PV
ELC-D-PV
ELVC-D-PV
ELC-D-PVG
ELVC-D-PVG



Air Leakage/Vacuum Test

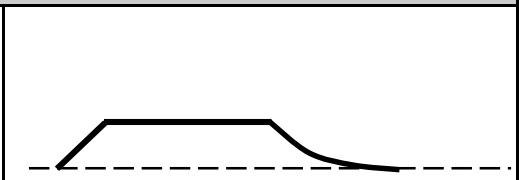
Parameters	Units	Factory Setting
1. Stabilizing Time	min	5
2. Test Time	min	10

Notes:

Chamber vacuum is brought to 10 kPa. Thereafter all valves and motors are closed for 5 minutes enabling pressure stabilization.

Program 16

Optional for all Models



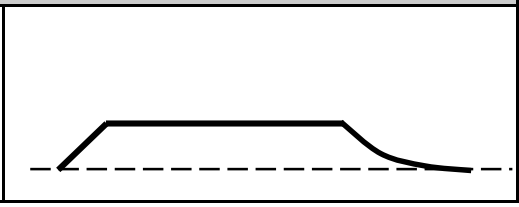
Isothermal

Parameters	Units	Factory Setting
1. Isothermal Temperature	ºC	85
2. Isothermal Time	min	15

Notes:

Program 17

Optional for all Models



Warm Up

Parameters	Units	Factory Setting
1. Warm Up Temperature	ºC	60
2. Warm Up Time	min	15

Notes:

SPECIAL OPTIONS AND ACCESSORIES

CONTROL SYSTEM OPTIONS

Independent Temperature Probe (PT100)
Independent probe that can be connected to an external independent device.

External Independent Recorder
This external recorder, with independent microprocessor control and power supply, is suitable for independent cycle documentation. This multi-range input recorder can record 4 channels at once from PT100s and/or pressure transducer. Simple operation with an easy-to-view display allows one to key-in various items of set data. The unit operates independently of the autoclave.

Special Custom Cycles
Other special programs like: glass-test, repeating program run, material stress test, Durham program,
long term test (days long), aging test, varnish test, and other application related programs are optionally available.

SOFTWARE OPTIONS

R.PC.R (Remote PC Reporting)
PC software for generating reports which include:

- graph of the cycle data
- numeric data of the cycle
- copy of cycle print-outs
- table of all measured values
- table of all parameters
- option to save all reports in PDF file format

The software allows 2 modes of operation:

Online mode
Up to 8 autoclaves may be accessed using a PC within the organization via an Ethernet connection. These autoclaves can each be remotely monitored at the same time showing all reports and graphs. History files are automatically downloaded from the autoclave.

Offline mode
Data is transferred from the autoclave using a standard USB memory device. This data can then be viewed with the report generator software on a PC.

HARDWARE OPTIONS

Note: Other hardware options such as vacuum pump, steam generator, etc. have been mentioned above in relevant sections.

Air Compressor
Introduces pressurized air into the chamber for rapid cooling of liquids for models with a fast cooling system.
Not needed if air pressure source is available on site.

Printer
Internal thermal printer for cycle documentation. During the cycle the printer records temperature, pressure, time, date, cycle status, end of cycle.

IQ, OQ, PQ
Installation Qualification (IQ) - documentary evidence to verify that the equipment has been built and installed in compliance with design specifications.

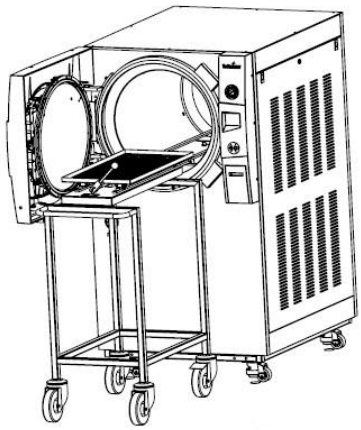
Operational Qualification (OQ) Preliminary Operational Qualification (OQ) - documentary evidence to verify that the equipment operates in accordance with its design specifications in its normal operating range and performs as intended throughout all anticipated operating ranges.

Preliminary Performance Qualification (PQ) - documentary evidence which verifies that the equipment or system operates consistently and gives reproducibility within defined specifications and parameters for prolonged periods.

Switch Box
Switch box from 3-phases to 1-phase, requested current 40A.

Mobile Lifting Device
The mobile lifting device for vertical autoclave basket with heavy sterilisation load up to 150 kg. The lift is mobile equipped with an integrated swivel arm for maximum maneuverability and can service a few autoclaves. Controlled by push buttons on a movable control handset. Equipped with a maintenance free electrical battery

Loading Equipment
Loading carts and transfer carriages on rails to assist the loading and unloading process. Constructed of high quality, durable stainless steel. The adjustable loading cart rolls from the transfer carriage onto the interior chamber tracks for easy handling of heavy loads.



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