



## TECHNICAL SPECIFICATION

### SINGLE DOOR AUTOCLAVE WITH HEATERS IN VESSEL (VACUUM MODEL)

#### MANUAL DOOR

180 Litre  
Model Ref. MVS180E

Client

Contact

Specification Date



Astell Scientific Ltd  
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MODEL NUMBER		MVS180E				
No. of Doors	Door Mode of Closing	Door mode of Sealing	Chamber Capacity	Machine Type	No. of Cycles	Type of Controller
1	Manual Upwards sliding door	Floating	180L	MC	4	Astell "Secure" Programmable Controller

### MODEL SPECIAL FEATURES

#### Pressure Interlocking

An independent pressure interlock is provided thus preventing the doors from opening should the chamber pressure be greater than atmospheric.

### REGULATIONS AND STANDARDS

All Astell Autoclaves are fully compliant with PD97/23EC notified body SGS 0353 (PD 5500).

### SERVICES

<b>Water:</b>	DN15 20 Litres per min
<b>Power:</b>	415v 3ph N 18 kW 25A
<b>Steam:</b>	Heaters in Vessel
<b>Drainage:</b>	DN 54 Floor level
<b>Vent:</b>	DN 35 Outside X 1 (chamber to drain)

### DIMENSIONS (approx.)

<b>Width</b>	780 mm
<b>Depth</b>	1200 mm
<b>Height Loading</b>	900/1000 mm
<b>Overall Height (inc. controller) Min</b>	1850 mm
<b>Weight</b>	500 KG

### VESSEL SIZE

The Autoclave chamber is 180 Litres. (500 w x 600 h x 500 d)

### MATERIALS

<b>Vessel/Chamber</b>	316L Stainless Steel
<b>Jacket</b>	Sectional – For cooling
<b>Door</b>	316L Stainless Steel
<b>Header Ring</b>	Mild steel / boiler plate
<b>Stand</b>	Zinc coated Mild Steel

### VESSEL INTERIOR

Bead Blast.



## **DOOR TYPE**

Upwards Closing (**Manually Sliding**)

The door will be constructed from the same material as the chamber and will be manually operated with the aid of a counterbalanced/spring system. It will not be possible to initiate a process cycle unless the door is fully closed and locked. Interlocks will be fitted to ensure that the door seal valves, steam to chamber valves and compressed air to chamber valves cannot operate unless the door is fully closed and locked (both electrically and pneumatically).

## **FRAME**

The entire sterilizer, including control panels, to be supplied on a self supporting single skid type frame.

The frame will be manufactured from mild steel and powder coated

## **EQUIPMENT ACCESS**

The sterilizer is designed to ensure that all valves and instrumentation etc. are readily accessible for maintenance purposes

## **PRESSURE DESIGN DETAILS**

**Designed and manufactured in accordance with PED 5500 / 2000 Pressure Equipment Regulations 1999 ( European Directive 97/23/EC)**

**All Pressure vessels can be Designed and manufactured to other Standards including ASTM / ASME Specification.**

At the design stage, the vessel drawings are submitted to a British independent A.O.T.C insurance company (**Lloyds or equivalent** ) for approval within the normal operating conditions of full vacuum to 3.88 bar absolute and 142.6°C.

The approved vessel is stage inspected during the manufacturing process by the independent insurance company who compile a quality history against each stage of fabrication from receipt of mill certified material to final hydraulic testing.

Full quality documentation and chamber hydraulic test can be supplied to each individual client by the insurance company.

The statutory declaration of conformity is separately issued by Astell.

## **DRAIN**

Chamber is self-draining and Discard cycle protection and full effluent retention can be optionally fitted.

## **MODE OF SEALING**

Pressure floating type O ring.

The door seal is constructed of a silicone rubber O Ring and is forced onto the face of the door by means of steam or air pressure applied to the rear of the door seal housing.

## **THERMOCOUPLE ENTRY**

Easy access thermocouple entry gland for validation purpose.



## SAFETY FEATURES

- a cycle cannot start until the door is closed and locked.
- Steam / heating cannot be applied to the chamber unless the door is closed and locked.
- The door release is interlocked with the chamber air break valve to ensure all residual pressure has completely and effectively vented to atmosphere before the doors can be opened.
- The door will retain its position in the event of failure of any service.
- The door seal to be steam resistant, and will seal effectively without trapping or entrapment of 'foreign' material.
- The door is thermally insulated to prevent the surface temperature presenting a hazard to operators. The surface temperature will not exceed IEC 61010 requirements.

Safety interlocks are provided, and are achieved by hardware, separate from and additional to the control system. All interlocks are configured to fail safe and to provide a signal to the control system to indicate that normal operation has been prevented, and to terminate the current cycle. The interlock system is designed so that its function can be tested during routine maintenance. Safety related interlocks are either hard wired or piped. The following safety interlocks are provided:

- if the door is not closed, the steam supply to the chamber will be turned off and remain turned off.
- if the pressure in the chamber exceeds 0.15 bar the door remains locked.

## CYCLES

Cycle No.	Cycle Name	Further Details
1	e.g. Media*	121°C for 30 min *
2	e.g. Glassware*	134°C - 121°C for 30 min*
3	e.g. Plastic Discard*	134°C for 15 min*
4	e.g. Fluid Discard*	121°C for 30 min*
5	<i>Additional cycle available with AAQ800 * Program Controller</i>	
6	<i>As above</i>	
7	<i>As above</i>	
8	<i>As above</i>	

\* All cycles and parameters listed above are examples only. All parameters are user selectable/adjustable

## CONTROLLER HARDWARE

Display  
Input  
Program storage  
Real time clock  
Memory  
Serial interface  
A/D  
Digital inputs  
Digital outputs  
Analogue Inputs

### Summary of Controller Features

5 Inch x 7 Inch Colour QVGA Touch Screen  
Touch Screen  
Flash Card  
Battery Backed  
64 MB DRAM / 256 KB SRAM  
RS232  
13 bit  
32  
32  
4



- The control system is based on an industrial PLC controller combined with a number of analogue and digital input / output units.
- The operator interface allows detailed monitoring of the process as well as cycle selection operation.
- A RS 232 port is available for connection to other peripheral devices such as a printer.

## **CONTROLLER SOFTWARE**

Language Basic

Key and password security system (multi levels )

Easy cycle construction using individual stages.

Multi Level User / Supervisor / Engineer Interface

RS232

- The control software has been developed for the precision control of autoclaves.
- The software is written in high language code in a manner that allows maximum clarity.
- The code is split into well-defined blocks each of which perform a specific action.

## **USER INTERFACE**

The controller is Astell design. The User Interface consists of a wipe clean color touch screen including generated function keys. The display is a 5 Inch x 7 Inch display unit. Individual analogue channels (temperature, pressure, etc.) are displayed.

## **PRINTER** (if fitted)

The printer is a 40 column fascia mounted dot matrix

## **SENSORS AND TRANSDUCERS**

1. Temperature sensors will be connected to the autoclave to monitor temperatures at the following locations:

Chamber Vent Temperature

Load Temperature (Flexible Probe) – OPTION IF ORDERED

2. Temperature sensors will be duplex where necessary. The elements of the probes will be utilised independently for the autoclave control system and the data logging system.
3. Pressure transmitters will be connected to the autoclave at the following locations:  
Autoclave Chamber  
Autoclave Jacket (OPTION IF ORDERED)
4. Calibration of temperature and pressure sensors will be possible through the operator interface. This function allows independent full loop calibration of each sensor in turn. The calibration function is accessed via the engineering menu.



## **INSTRUMENTATION**

<b>Chamber pressure</b>	Analogue
<b>Chamber pressure</b>	Digital
<b>Chamber temperature</b>	Digital
<b>Load temperature</b>	Digital (OPTION IF ORDERED)

## **VALVES**

Air Operated Angle Seat Globe Valves

## **EXHAUST COOLER**

Plate heat exchanger

## **PIPE WORK**

Copper silver soldered Joints and Unions with screwed fittings kept to a minimum.

## **WATER**

It should be noted that the cooling water should comply with the requirements for Total Dissolved Solids PPM, parts per million. Should the supply water be too "hard" scaling could occur on valves.

### **Water Conservation System**

The water conservation system is designed to minimise the water usage of the autoclave during cycle by controlling the water temperature in the water tank.

A thermostat only allows water to be added to the water tank if the tank water temperature rises above the set point. The system pumps are protected from running dry by a float switch mounted in the water tank. This overrides the water conservation and feeds the water to the water tank regardless of the water temperature.

This system has the effect of greatly reducing the water utilised by the autoclaves compared to continuous feed systems.



## **SPARE PARTS**

Spare parts kits can be provided upon request

## **HYDROSTATIC TEST**

On completion of manufacture, the autoclave chamber is to be subjected to hydrostatic tests appropriate to the design code used, in compliance with insurance requirements and client pressure vessel requirements. Astell employ, in line with PD5500,PD97/23EC independent design approval and stage inspection suitable for all Pressure vessel regulations.

Testing other than usual requirements may involve additional costs that will be borne by the customer.

Please note that regular re-Hydraulic testing is a standard feature of an autoclave's lifetime and thus the autoclave installation site must be capable of supporting the hydraulic weight of a chamber filled with water. Please allow 1kg per litre capacity of the chamber above Static Weight.

## **PERFORMANCE TESTS**

### **WORKS TESTING PRIOR TO DELIVERY.**

All electrical equipment is Safety Tested in accordance with the Low Voltage Directive.

Astell shall perform the following standard Factory Acceptance Tests. The tests are included in the machine costs as per the quotation and the client is free to witness the tests as performed at our manufacturing site :

Connect and check all supplies	Produce printout for each cycle tested
Check EPROM's and software version	Check door pressure interlock
Power up controller and check door open/close operation	Carry out sterilise monitor timer test on each cycle
Install relevant cycle data as required by client	Run cycle and check for any leaks
Calibrate all temperatures and pressures	Check all safety valves
Check rotation of all pumps and motors	Run each cycle and check conforms with applicable standards
Check safety devices	
Cycle testing	Run each cycle and document

## **INSTALLATION & COMMISSIONING**

Must be carried out by qualified personnel.

## **SUPPLY OF DOCUMENTATION**

User manuals  
Pressure Vessel test certificate  
Installation Drawing (if applicable)

## **WARRANTY AND MAINTENANCE**

12 month parts & labour warranty.