

## CHOOSING AN AUTOCLAVE BY LOAD TYPE

# LIQUIDS

*Culture media, reagents or fluid discard*



LEADERS IN STERILIZATION SINCE 1884



## WHAT IS YOUR LOAD TYPE?

### What is a 'fluid load'?

Fluid or liquid loads typically comprise solutions or chemicals used in the laboratory environment, e.g. a growth medium, but could be any non-solid that requires sterilization. A growth medium or culture medium is a solid, liquid or semi-solid designed to support the growth of micro-organisms or cells under test conditions. Different types of media are used for growing different types of cells.

An autoclave is used to sterilize media before use. Although many types of media require sterilization at 121°C for 15 minutes, different sterilizing temperatures and times may be necessary for certain types of media, and therefore any autoclave used for the sterilization of media must be capable of sterilizing at a variety of temperatures.

### Fluid discard

Fluid discard loads will inevitably comprise of waste fluids that need to be sterilized prior to being disposed of. Typical fluid discard loads could consist of used or redundant media such as Nutrient Broth, reagents, liquid specimen samples, cleaning solutions, biological waste etc.

### Sealed fluids

Some fluid loads may require to be sterilized in special sealed containers. Air purging (or 'freesteam') is normally sufficient to remove air, and extended freesteam should be unnecessary. As with media preparation the speed of processing is vital to the quality of the end product and often temperatures in excess of 121°C will be used to speed up the sterilization process. The cooling time should be as short as possible.

## FAQs

### What is the best value cooling system for your medium sized autoclaves?

Assisted (air) Cooling or Advanced Water Cooling. These are comparable in performance, depending on the relative temperatures of the water supply and ambient air. Our estimate is a 5-10% reduction in cooling time. This can be further improved at a relatively low cost with Autodrain, but the customer would have to consider Autofill for convenience, and Drain Cooling if the drains are not suited for carrying boiling water and steam for prolonged periods.

## THE CHALLENGES

### Challenges of liquid loads

A fast heat up and cool down is beneficial to maintain the quality of the finished product and prevents 'over cooking' which leads to a deterioration in the quality of the growth medium.

Should the autoclave be opened at a temperature higher than 80°C, the sudden change in pressure can not only cause the media (or other fluids) to boil over; there is also a significant danger that bottles could break or explode!

Boil-over of fluids is usually caused when the chamber pressure during the cooling stages falls quicker than the temperature in the load.

All Astell autoclaves can be used to sterilize fluids, but to do so quickly necessitates some cooling options. If fast cooling is required you need to replace the steam with air ballast during cooling to reduce the possibility of boil over. A water jacket (with an internal fan, when required) is an extremely efficient means of cooling and will require the addition of air ballast to prevent the boil-over of bottled media etc.

Non-rigid containers will benefit from ramped cooling where the chamber pressure is lowered in a number of steps to coincide with the load temperature to prevent non-rigid containers deforming or bursting during the cooling stage.

### Recommended options

- **Load Sensed Process Timing** – allows the sterilization cycle to be controlled via the temperature achieved in the centre of the load as well as the chamber. This is identified by locating a wandering probe in to a media bottle or reference item during the sterilization cycle.
- **Assisted Cooling** – choose from a number of options including Fan Cooling, Water Cooling (Coils) and Water Cooling Jacket. Refer to individual ranges for the compatibility of cooling options.
- **Air Ballast** – provides controlled chamber pressure during the cooling phase, preventing boil over of bottled fluids. Must be ordered in conjunction with Load Sensed Timing.
- **Air Compressor** – a compressed air supply is essential where Air Ballast is fitted.



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## ASTELL RECOMMENDED PRODUCTS\*



### Top Loading Range

95 – 135 litres

- Vertical chamber with gas strut assisted door and fast-action locking mechanism
- Size optimised baskets and discard containers ensuring maximum chamber usage. Optional integral hoist for heavy loads
- Compact design with castors for easy movement
- Full range of options comparable with much larger machines



### Front Loading Range

120 – 344 litres

- Horizontal chamber provides easy loading access
- 5 standard chamber sizes up to 344 litres in capacity
- All units feature Astell's 'Swiftlock' secure door closure system
- Optional shelves and discard containers provide chamber loading flexibility



### SQUARE Range

125 – 735+ litres

- A choice of 7 standard chamber sizes and either a manual or automatic door
- Integral Steam Generator fitted as standard
- Fully customizable design built to customer requirements
- Ideal for high throughput laboratories

\*Please note these are suggested model ranges. Other products and options are available. Please contact us for a personal recommendation, providing a description of the load type(s).

### Product highlights

All Astell autoclaves have the following features:

'Heaters in chamber' models have 'media holdwarm', a feature that uses the heaters to hold sterilized media at a set temperature until it is to be used.

Autoclaves are manufactured to the principles of the Medical Devices Directive and in accordance with Pressure Equipment Directive (PED 2014/68/EU) and ISO 9001:2015 quality standards.

5.7" colour touchscreen controller with USB connectivity; allows users to edit cycle parameters, store and recover historic cycle data, add security levels with user passwords and more.

316L-grade stainless steel pressure vessels with electro-polished finish.

LSPT probe features 316L stainless steel conduit to protect the probe whilst inside the autoclave, and during unloading/unloading.

Industry-standard safety features to ensure the well-being of both the sterilizer and its operators; including external pressure gauge, over pressure and over temperature protection, a safety-linked door mechanism and thermally insulated doors.

**Optional** stainless steel pipework and panel work if required.

**Optional** controller software that meets the guidelines of FDA 21 CFR Part 11 Electronic Records; Electronic Signature final rule legislation.

### When asking for a quotation...

Remember to answer these four questions when asking for a quotation.

- What size of autoclave do you need?
- What items will you (or your customer) be sterilizing?
- Does the load need to be dry at the end of the cycle?
- How many cycles do you wish to run per day?



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