

## Safety, Hazard Containment & Sterilising Equipment

### Planning for an Autoclave Installation

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When sourcing expensive and sophisticated equipment such as a laboratory or research grade autoclave it is essential to ask the right questions, get the right answers and to understand the real purpose of the autoclave, being sure the autoclave has the right specification to perform effectively and efficiently, especially if ultimate proof to a certifying body is procedural. Having made that initial product selection lab managers need to consider the suitability of the final location and the installation process.

A correctly installed autoclave can prove extremely energy efficient and provide many years of reliable sterilising whatever the medium and industrial sector – biology, education, food and pharmaceutical. Careful planning for installation of that new laboratory autoclave as a precursor to actual purchase and making the right equipment choice can results in lowering operational costs.

When planning and designing a laboratory the task of positioning or repositioning a laboratory autoclave offer many hurdles to overcome. While bench top autoclaves and those with a small footprint usually present fewer problems there is often a temptation to over specify in terms of chamber size to gain greater throughput and this may present several problems i.e. trying fitting a quart into a pint pot. This not only equates to available space in the laboratory but also to the access path for delivery.

The following points should also be considered when undertaking new autoclave purchase or lab refurbishing, changing re-positioning of equipment.

#### Potential Problems

It is not unknown for some suppliers to leave their equipment at the bottom of the stairs if there is no easy access route - leaving the problem of getting the autoclave where it is meant to be down to the buyer. For difficult access situations a small number of manufacturers are able to produce their autoclave designs as a modular build, the unit carefully re-assembled and fully tests on site by their service engineers on-site.

In older buildings which have been adapted from their original uses, access, floor loading and drainage, or both can be a problem. These are not always alleviated in newer buildings as it is not unusual for architects, when designing and positioning a laboratory, to be unaware of the requirements for delivery and installation of large, heavy pieces of laboratory equipment, such as a large 700 litre chamber autoclave weighing in at around 950kg.

Most reputable autoclave manufacturers operated with a team of skilled service engineers that will ensure correct installation procedures are followed. This gives provision for easy access to controls for future service and test as well as associated pipework and drains.

#### What to Consider

Most laboratory autoclaves generally live in splendid isolation in the corner of lab - until they stop working. It is a little late then to discover that service engineers, although adaptable, may not fit into a 50mm access gap whilst your laboratory gradually grinds to a halt.

It is often the case that little thought is given to the services and space required for the installation of such equipment or to the removal of equipment with a shorter life-span than the building.

Also, greater sophistication of laboratory autoclaves with venting and vacuum systems, coupled with an increased awareness of possible bio-hazards means that in most cases it is no longer sensible to plan the position of an autoclave without considering drainage and water supplies.

Key points to consider:

Positioning and Installation:

1. Can you get the autoclave into the proposed location via any steps, corridors, tight corners and doors?
2. If on an upper floor, is a suitable lift available?
3. Will there be sufficient around space for service access?
4. Is access to a drain available and if so is the drain vented at high level?
5. Is the drain height low enough to offer a 'constant fall' drain once connected?
6. Room size - just how much space do you really have?

For installation of a cabinet type autoclave there should ideally be at least 500mm to each side, to the rear a space of 300mm and to the front – 2 metres or twice the length of any loading trolley;



*This multiple autoclave installation carried out by Priorclave is indicative of the around-space required for service, with clear access to pipework.*

Consideration has also to be given to heat extraction, especially if installation is planned in a separate small autoclave room?

Matching manufacturers' service requirements:

- a. Power: 415V three-phase or 240V single phase and how many amps?
- b. Water: - will mains water be OK or will treated (softened or RO) water be required? Is the supply pressure sufficient?
- c. Drains: are they heat resistant and able to withstand steam up to 140°C?

Domestic plastic waste pipes will melt if connected to an autoclave and on some other systems, although the pipes are temperature resistant, the joints can be affected over time. This can be overcome by cooling the autoclave exhaust but it is better arranged at the time of manufacture rather than after a costly leak.

Are the drains big enough?

Are they vented at a high level outside of the building?

Is a separate drain for overflows and drip trays required?



*When loading large chamber laboratory autoclaves it may be essential to utilise a trolley for personnel safety. This highlights the need to have sufficient space for full door-swing and deep access for front loading in front of the machine.*

## Choice of Steam Generation

- Heating elements in the chamber - this requires either manual water fill or uses autofill in which case a water feed and auto-drain will be required.
- Built in electrically heated steam generator - Electrical heaters are fitted into a separate chamber directly attached to the main autoclave vessel. As with the 'in chamber' system, steam generation is controlled by the autoclave temperature controller.
- Built in electrically heated high pressure 'on demand' type generator - this maintains a high-pressure steam supply available on demand and is generally comparable in performance with an external steam supply or a 'standalone' steam generator. For a busy laboratory with a constant flow of medium for the autoclave this set-up would be ideal.
- Steam Heated from an external steam source - where organisations have their own steam room and providing it is sufficient close to the autoclave installation it could prove as the steam source. An autoclave requires good quality dry steam to function correctly and whilst connection to an already available steam source sounds ideal unfortunately some in-house supplies can be unreliable.

Compressed air - if required for door seals and control valves on some autoclaves and for air ballasting systems. Is there sufficient pressure and capacity?



*Where a sterile lab environment is required the pass-through (or double door) autoclave is ideal. For such applications this requires a bespoke design that with a unique bulk-head system to create that secure installation between two rooms - the functioning laboratory and a clean room where chamber emptying takes place.*

## Pre Sales Advice Could Save £'s

If there should be a problem with any of these issues it is not necessarily the end of the world. By talking to your autoclave supplier or manufacturer of choice at an early stage in the planning and buying process most issues can be quite easily overcome. Most manufacturers are more than happy to carry out a site survey as part of the purchase process. This could save considerable expense later with regard to delivery and installation.