



General Information

Pass-Through (Double Ended) Autoclaves



Priorclave are pleased to offer our uniquely comprehensive design and advisory service to help you to correctly specify and design and autoclave to suit your particular requirements.

Each site is different with the requirement for doors to be hinged to swing in different directions and with the location of the required services. Final manufacture therefore requires full details of the proposed location and operation routines. This can be achieved by a site survey by one of our representatives or by the supply of detailed drawings.

Priorclave manufacture Pass-through autoclaves in 150L and 200L capacities with circular chambers and upwards from 350L with Rectangular chambers.

Priorclave pass-through autoclaves Comply with current UK and EU safety regulations, are fully Insurance Approved for pressure vessel design and construction and offer a 10 year pressure vessel warranty. They are CE Marked under the Pressure Equipment Directive PD5500:2000.

Protection against cross-infection is provided by the unique **BioCote** anti-bacterial agent, which is effective against the growth of all bacteria and fungi including MRSA and is incorporated in the epoxy coating on all panels and frame members.

Designs conform to the general requirements of BS2646 and are CE Marked for BS EN61010-2-41, Low Voltage and Electromagnetic Compatibility Directives.

The following provides some insight into the general issues surrounding pass-through autoclaves. For further details please contact Priorclave Sales.

General



Pass-through, or Double Entry, autoclaves are used in relatively small numbers and so generally are not a serially produced item. Due to this any double entry unit can be considered in some extent to be a bespoke design, albeit one that is created by adding a second door to a standard model. Due to the bespoke nature of the design, within certain constraints, a degree of flexibility exists which raises additional points for consideration.

Double ended autoclaves can be required for two main purposes, whilst these may vary slightly they are considered in this document to be divided into the classifications of clean room installation, and containment suite operation. In the case of a clean room application the autoclave is used for the sterilization of equipment entering a clean or aseptic area such as a pharmaceutical production environment. In the case of a containment application the autoclave is used for the de-contamination of material prior to its release from the containment suite which would typically be a laboratory handling high risk hazardous material.

In both cases isolation of both ends of the autoclave is required. The autoclave will be sealed at the point of passing through a wall by means of a bulkhead. Close sealing of the bulkhead and wires, pipes etc passing through it is observed as closely as possible in the design of the autoclave, but it is not normal for this sealing to be considered absolute at the manufacturing stage and extra sealing may be required during installation. In addition, the integrity of the containment may be improved by an air pressure differential between the rooms in which the equipment is located.

Door operation

It is an essential requirement of BS2646 that double ended autoclaves have interlocks to prevent both doors being open at the same time as this would obviously breach the integrity of the site. It is also required that an interlock is present to prevent the door at the unloading end from being opened until the sterilization cycle has been successfully completed and the load is safe to pass into the unloading end. It is also a requirement of BS 2646 that it is not possible to release the loading door until the unloading door has been opened and subsequently closed and locked. It is normal to specify that an override be fitted to permit opening of the loading door should this be required. This should be by means of a key to prevent unauthorised operation.

Orientation

In the case of a containment suite autoclave it is usual for most of the autoclave to be located within the unloading room with just the door section of the autoclave protruding into the containment area. In this way it is possible for the majority of maintenance tasks to be completed without the need for the engineer to enter the containment area. As all of the autoclave plant is located in the unloading end it therefore follows that the drain and other services will also be at this end, minimising the number of pipes and wires etc that need to pass through the wall or bulkhead. It is desirable for the main electrical isolator to be located at the unloading end, again to minimise on penetration of the





wall, but consideration should be given to the need to be able to shut down the autoclave from the loading end in an emergency.

In the case of a clean room installation it is usual for most of the autoclave to be located within the loading room. Again this permits most maintenance tasks to be performed without the need for the engineer to enter the clean area, in this case however this is more important as certain maintenance tasks can present a serious threat to the clean area. Again, the services should be located at the same end as the majority of the autoclave plant.

Recording device

For all applications requiring a double ended autoclave it is normally essential to have a recording device fitted to produce a permanent record of each autoclave cycle, whether this be a printer forming part of the autoclave control system, or an independent chart recorder. There are arguments to support locating the recording device at both ends of the autoclave. Consider the following:

It is desirable for the operator unloading the autoclave to be able to examine the record before opening the autoclave.

Which end of the autoclave is the autoclave log to be kept? The recording device should be at the same end.

It is often not permissible to take a paper record out from a containment area.

A paper record will shed fibres in a clean room.

Thermocouple entry ports

As with recording devices there are arguments to support location of these at both ends, however Priorclave strongly recommend that the entry ports are located on the unloading end side of the wall for a containment suite and the loading end for a clean room. The ports should be as close as possible to the wall. Consider the following:

During commissioning tests and periodic re-validation it will be necessary to place thermocouples in the load as the autoclave is being loaded. This requires that the entry port is located close to the loading end, but does not necessarily mean that it has to be located on the loading end side of the wall.

It may not be desirable to take test and recording equipment into a clean room or containment area.

It is often not permissible to take a paper record out from a containment area.

It is often necessary to operate the test equipment whilst operating the autoclave loading end controls (provisions can be made to overcome this).

If the test and recording equipment are inside the containment area / clean room the requirement to don / remove protective clothing each time the area is entered / exited is time consuming.

Steam heated units

In the case of direct steam heated autoclaves it is desirable for the steam plant to be located at the main plant end of the autoclave, however as it is necessary for the steam pressures to be monitored from the loading end. In the case of containment suite sites this will necessitate passing the pressure gauge pipes through the wall, and possibly the provision of a duplicate pair of pressure gauges.

Clean room applications

Electrically heated autoclaves have a water charge inside the chamber, which will be exposed to the clean room when the door is opened, and presents a potential source of contamination if un-sterile water is being fed into the autoclave. It may be desirable to use a purified and / or sterilized water supply. Whilst the steam produced from the water within the autoclave leaves most of its contaminants behind in the water reservoir, if there is a risk associated with contamination of the load this presents another case for the use of purified and / or sterilized water. It is common for autoclave water level controls to work by means of conductivity, if purified water is to be used this will require special consideration. Highly purified water is corrosive to some metals and this will also require consideration.

Due to similar contamination considerations to the above it may be desirable to provide a clean steam supply for direct steam heated units. Clean steam generators to produce a local supply for the autoclave can be supplied.

Pipes entering and exiting the autoclave

In the case of a single ended autoclave it is common for pipe work and electrical connections to be made at the rear of the autoclave. In this way unsightly pipes with potential heat hazards are out of the way behind the autoclave. However, in the case of a double ended autoclave it is necessary for services to connect via the sides of the autoclave, and further consideration for the covering or guarding of pipes may also be necessary. This is a particular concern if larger items such as drain condensers or exhaust filters are fitted. In some cases it may be worth considering enclosing the whole of the autoclave excluding the doors with partitions to effectively form a plant room.

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The advice and information given is in good faith and based on the considerable experience gained by Priorclave with similar installations. However, no liability or responsibility is accepted by Priorclave Ltd, its servants or Employees for this advice and information.

