

Safety, Hazard Containment & Sterilising Equipment

Autoclave Wrap – No Jacket Required

Author: Tony Collins, Managing Director, Priorclave Ltd

Purchase a rectangular chamber laboratory or research grade autoclave and the dealer/manufacturer may suggest the provision of a steam/water jacket. These are optionally available on many laboratory autoclaves and are effectively another pressure vessel surrounding the main sterilising chamber. Within the void steam or cold water is run to heat or cool the outside of the actual autoclave chamber.

However, once you wrap your autoclave in a jacket it immediately becomes more costly to purchase and to run so talk with an established manufacturer as other systems are available that are effective for many load types so it may be possible to discard the jacket.



Basic Facts

The majority of sterilising chambers are manufactured in stainless steel and are available in a choice of two formats – round or rectangular. In the former there is less useable space than in rectangular section autoclaves for a given volume, however in practical terms there becomes a trade-off against improved steam circulation versus cost/lab space.

For heavier duty, higher capacity sterilising processes rectangular chambers are the preferred style as they hold more load, whether on a single shelf or across multiple shelves. However careful and skilled loading is necessary so as not to cram the chamber wall-to-wall and top-to bottom thus restricting steam circulation. If steam cannot get to the entire load or the air cannot escape then sterilising will not be effective. Also, because of the higher load volume with this style of autoclave vacuum air removal is strongly advised.

During the sterilising process the chamber is under server pressure, therefore to prevent it distorting a rectangular autoclave chamber is built with much thicker walls than cylindrical chambers. It also requires substantial bracing around the outside of the chamber. This makes the design more expensive to build and heavier than cylindrical models.

Optimising Chamber Heat-up

Throughout the sterilising process, these laboratory autoclaves require more heating and will cool more slowly because of the additional weight of metal and be more expensive to run.

Heating the outside of the chamber wall reduces condensation onto the load during heat up and for drying is proved to be a good solution for achieving the maximum dryness. When sterilising loads such as pipette tips, tubing, instruments, textiles (lab gowns and shoes) and other porous type loads, vacuum alone will not achieve total dryness, the only way to dry loads effectively is by having the steam jacket.

The heating effect of the steam jacket plus a high vacuum, flashes off all residual moisture from the load, whilst minimising cycle times. Since a constant supply of steam is required the autoclave must receive its supply from a direct source or steam generator.

Control Faster Cooling

Naturally when cold water is run around the external jacket it helps achieve faster cooling times. This requires a large amount of water unless an external re-circulation and cooling system is deployed.

The cooling cycle also requires care, too fast and the chamber returns to atmospheric pressure with potential for breakage of glass bottles and containers and for media loss. An effective solution for controlling the cooling cycle is the introduction of an Air Ballasting system; it protects the load from damage through a rapid fall in chamber pressure. Using this solution it equilibrates pressure within the chamber and any sealed item, thus preventing potential breakages.

Over Specified

Introduce a water/steam jacket to a rectangular chambers autoclave and there are some immediate inherent costs:

1. More complex to build due to additional extra pressure vessel and its additional valves and control gear
2. extra plumbing to account for connection direct steam or via generator
3. longer lead times due to more complex special build
4. higher running costs primarily due to increases water and energy consumption
5. more expensive on-site installation
6. increased level of regular maintenance

Some manufacturers may offer a choice of either full or partial jackets depending on the applications and operational requirements.

Although initially it may seem that laboratory or research grade autoclave equipped with a steam/water jack may seem the best solution it is always advisable to talk directly with an established autoclave manufacturer. Unless you are looking to run your autoclave 24/7 there may be a less costly and energy efficient solution.



The Priorclave RSC range of front loading autoclaves with their taller, large rectangular steam sterilising chambers has become a popular choice for laboratories undertaking high-volume throughput or frequently tasked with handling taller and bulkier items. Despite the extra-large chamber these autoclaves require only a relatively small floor area.

All RSC models are equipped with a patented large hand-wheel door closure system for easy safe opening/closing of the robust rigid hinged door. An inherent feature is the fitting of thermal and pressure lock systems to the lower hand-wheel, this prevents door opening at load temperatures above 80°C and pressures above 0.2 bar thus averting potential accidents through discharge of hot, high-pressurised steam.

These Priorclave autoclaves are ideally suited to a wide variety of applications within food and drink, dairy, pharmaceutical, agriculture, education, healthcare and research laboratories.

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