SHILPENT®

SHILPA ENTERPRISES

HYDROTHERMAL AUTOCLAVE

Product Catalogue

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Description

The Hydrothermal Autoclave Reactor use to carry hydrothermal reactions at high pressure and high temperature. Hydrothermal synthesis reactor generally comes in two variants: Polytetrafluoroethylene (PTFE) or Teflon-lined hydrothermal autoclave reactors and the second is PPL lined autoclave. Hydrothermal reactors are mainly made up of two parts; an outer high-quality stainless-steel jacket and an inner Teflon liner or Teflon chamber. In the Teflon-lined autoclave, the reaction is carried out at maximum 240 °C (428 °F), while the safe temperature is 200-degree Celsius (392 °F). PPL-lined reactors used for the reaction operate at a higher temperature, where the safe temperature will be 260 °C (500 °F), and the maximum operating temperature is 280 °C (536 °F). This product is extensively used in the scientific laboratory, research and development labs, institutional organizations, quality analysis section in industries, etc.

Shilpent developed and supplied two types of sealing for the tightening of a reactor vessel. We used the double-coated Teflon vessel for better performance. The screw-type sealing has been given to the reactor with a capacity of 10ml, 25ml, 50ml, 100ml, 150ml, 200ml, 250ml, 300ml, 400ml, and 500ml, while the flange type sealing will be in a 1000ml, 1500ml, and 2000ml autoclave. The autoclave has been designed for external heating where the reactor can be heated in the oven, furnace, or self-heating. The ideal heating and cooling temperature rate for better results will be 5 °C.

Cleaning

The newly purchased hydrothermal reactor is cleaned correctly, adding some acetone to the liner. The system can be boiled in water for some time.

If the sample is acidic, it is recommended to use alkaline materials for cleaning. It is recommended to use acidic materials for cleaning if it is alkaline.

Operations

1. Place the Autoclave on the table or the shelf.
2. Turn the screw-type threaded primary SS cap (SS Alloy 316) in an anticlockwise direction until it has been opened.
3. There is 2 type of SS lid in the reactor, 1 is on the bottom side, and another is on top of the Teflon vessel chamber.
4. Lift the top SS lid and take out Teflon or PPL reaction chamber.
5. Now fill the solution (as per liner's capacity) in the reaction chamber and seal it. Maintained the feed factor around 0.85.
6. Make sure that the Teflon or PPL cap should be air-tight to avoid pressure leakage.
7. Place Teflon or PPL liner in a stainless-steel chamber.
8. Keep the top lid over the vessel and ensure that the Teflon-lined vessel is placed properly in the Stainless-Steel chamber.
9. Then turn the primary SS cap in a clockwise direction until it does not turn anymore.
10. The secondary SS cap has been given at the top of the primary cap for extra tightening to avoid pressure leakages.
11. Rotate the primary SS cap in the clockwise direction with the help of a locking rod for additional tightening.
12. Placed the hydrothermal autoclave in an oven or furnace and heat it till the reactor's safe temperature.

13. Before setting the temperature, initially identify the type of reaction. If the reaction is exothermic, then the set temperature should be lower than the safe temperature.
14. Increase the temperature of the oven and set the heating rate at 5 ^{0}C/minute.
15. After completing the hydrothermal synthesis reaction, cool the autoclave at the rate of 5 ^{0}C/minute.
16. Remove the inner liner vessel after complete cooling of autoclave to avoid deformation of a liner.
17. Make sure that, after completing the process, clean PTFE or Teflon liner properly for reuse.

Precautions

1. The temperature of the external heating is not more than 200 Celcius for PTFE and 260 Celcius for PPL, heating rate: ≤ 5 °C/ min; you can use the PID temperature control system to control the temperature, cooling rate: ≤ 5 °C/
2. min, the safety pressure of 3MPa.
   It is advised to open a reactor after complete cooling. It is suggested to cool it for 6-8 hours.
3. The vessel should not fill more than 80% of its capacity.
   Proper tightening of primary as well as a secondary cap to avoid pressure leakage.
4. Heat-resistant gloves must be used while handling.

Parts Details

TEFLON LINED AUTOCLAVE

PPL LINED AUTOCLAVE

ROBUST DESIGN AND HEAVY METAL BODY

CAPACITY10-25ML

CAPACITY 50-500ML

CAPACITY1000-2000ML

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