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# STERILISATION

## Sterilization by filtration

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# Sterilization by Mechanical Methods

## Ceramic filters:

- These are also called as filter candles and are made of porcelain or Kieselguhr.
- Kieselguhr filters are usually softer than the porcelain variety.
- These are cylindrical candles with an opening which is connected to vacuum pump for reducing the pressure under it, during the filtration process.
- Due to difference in pressure between the outside & inside of the candle, the solution moves into the candle.



- The candles are available in a range of different pore size which is designed by a number.
- The filtrate is collected in sterile container.
- The filter candle gets blocked with continuous use.
- This can be cleaned by scratching the external surface with a nail brush and passing water through it in the reverse direction.
- The main disadvantage of ceramic filter is its tendency to absorb materials from aqueous solution.





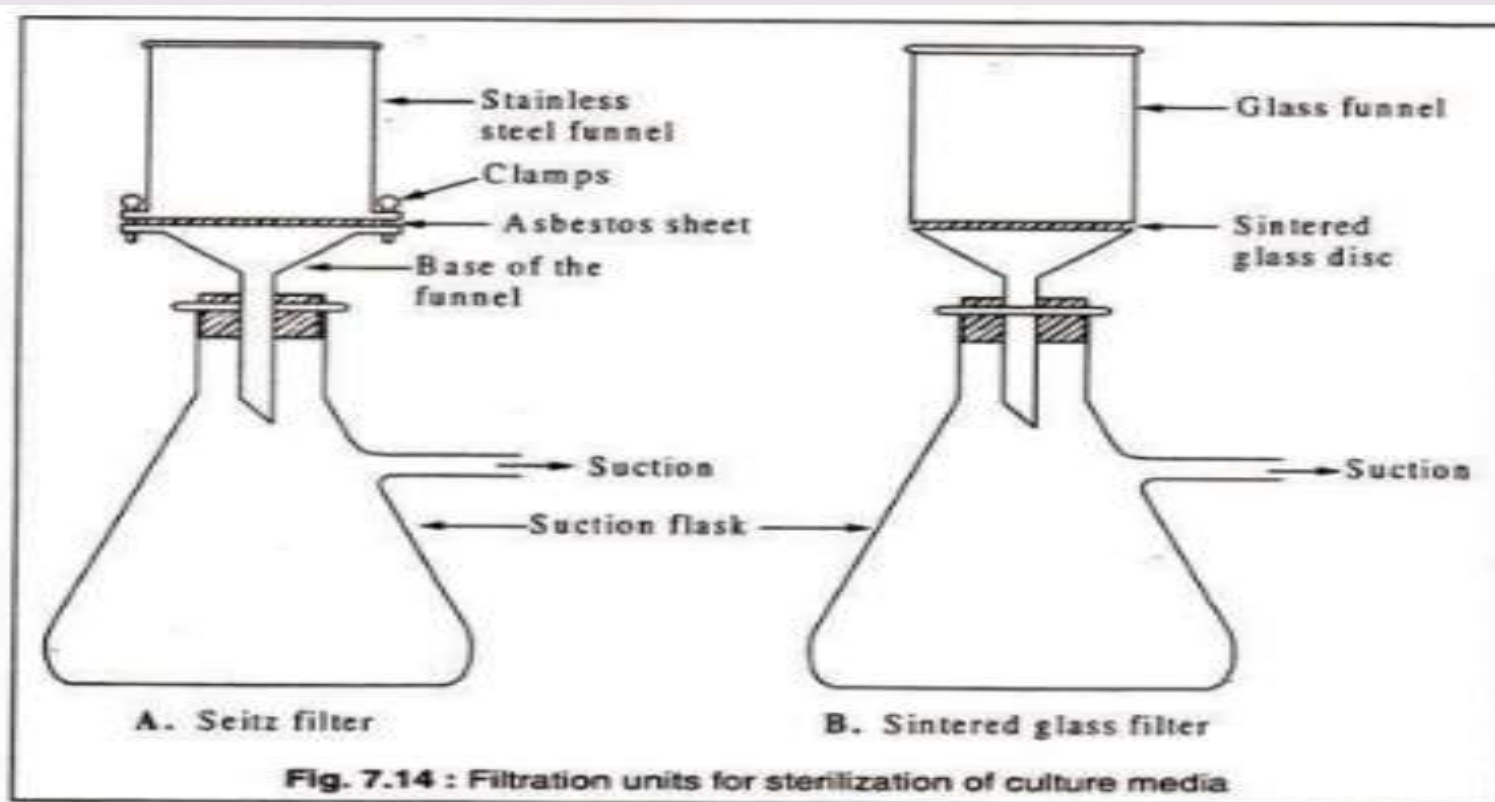
## **Seitz filter:**

- It consists of two parts, the lower part holds a perforated disc, on it a compressed asbestos sheet is placed & those two parts joined together with help of nuts.
- A valve on the upper part through which vacuum is applied.
- The asbestos sheet is made up of asbestos but may also contains cellulose & alkaline earth such as magnesium compounds.
- The asbestos pads are used once & then discard.



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- Asbestos pads may yield alkali & cause precipitation of alkaloids from aqueous solution of their salts.
- Due to the fibrous nature of asbestos pads, it may shed fibers into the filtrate & also absorbs drug from solution.
- Hence, a few millimeters of filtrate should always be rejected & sintered glass disc may also be fixed in the filtration unit immediate after Seitz filter.





## **Sintered glass filters:**

- These are made of borosilicate glass.
- Borosilicate glass is finely powdered, sieved and particle of desired size are separated.
- It is then packed into a disc mould and heated to a temperature at which adhesion takes place between the particles.
- The disc is then fused to a funnel of suitable shape and size.
- The sintered glass filters are available in different pore size.
- Hence the funnel with a sintered filter is numbered according to the pore size.
- The filtration is carried out under reduced pressure.





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- These funnel are used for bacterial filtration & bacterial proof filtration number 5 or 3 must be used.
- They do not absorb the medicaments from the solution & does not change the pH of the solution.





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## **Sintered metal filter:**

- These are metallic counter part of sintered glass filters.
- These are usually made from stainless steel.
- They having greater mechanical strength, but are liable to attack by the solution passing through them.

## **Membrane filter :**

- These are made of thin and flat membranes of cellulose derivatives, such as, cellulose acetate and cellulose nitrate.
- They are also called millipore filters.
- These are fixed in metallic holders similar to those used with asbestos pads.
- The pore size in the range of 100-150 $\mu$ .
- They are suitable for aqueous and oily solutions but not suitable for organic solvents such as alcohols, ketones, esters or chloroform.





## **Advantages of bacterial filtration**

- Suitable for sterilization of thermolabile medicaments.
- Living bacteria as well as dead bacteria are removed from preparation.
- Clarification & sterilization are done side by side.
- It is useful of a small volume of parenteral solution in an emergency.

## **Disadvantages of bacterial filtration**

- The suspension & oily preparations cannot be sterilized by this method.
- There a chance of absorption of medicaments from the solution.
- Units may leak if carelessly handled.
- Aseptic technique is necessary.
- Highly trained staff is required.
- The process is only suitable for solution form.