



## Medical Suction Apparatus

### Vacuum properties and needs

1. Using a high-capacity pump connected to a large reservoir in a central position.
2. Patient side of pipeline is fitted with a self-closing non interchangeable valve, attached to reservoir bottle and delivery tube.
3. Should be a trap, to prevent liquid and solid matter being drawn into pipeline system which difficult to relieve it.
4. A pressure regulator to avoid high pressure applied to patient.
5. A switch on/off to control work of central vacuum pump which operate intermittently to maintain vacuum in central reservoir.
6. Two pumps used, one in used other is standby (e.g. Maintenance and Repairs, low cost, safety,...).
7. Output of vacuum should discharge to open air through a filter to avoid spread of infection.

### Reservoir properties

Whatever the source of vacuum the size of reservoir is important.

1. Sufficient capacity should be allowed for all the matter to be aspirated.  
If too big reservoir used, the total time to build up negative pressure in it increased even if closed completely.
2. Rim of jar should be free from chips, sealing washer, should be in a good order to avoid any leak.
3. Graduated jar so the aspirated volume especially blood can measure.
4. If large jar is used, a big neck selected so hand easily enter to clean it and sterilization.

### Delivery tubing properties:

1. The diameter and length of delivery tubing should allow the greatest possible amount of suction at the patient end.
2. According to gas law, there is low resistance by wide tube and short length as possible.
3. Using a firm wall tubing to prevent collapse and kinking.

### Suction nozzle and catheter properties:

1. Smooth out line tip shape to prevent damage to delicate surface.
2. Used mostly disposable plastic suction end, or other which can be cleaned and sterilized by autoclaving and reused.
3. May be necessary to use a long narrow tube catheter as bronchial suction but otherwise, excessive length should be avoided.
4. Two moving holes to prevent blockage.  
Blockage get when the pressure is too high to pass air into delivery tubes.



Al-Mustaqbal University / College of Engineering & Technology  
Department (Medical Instrumentation Engineering Techniques)  
4<sup>th</sup> Class  
Subject: Medical Instrumentation III  
Lecturer: Lect.Dr. Amal Ibrahim Mahmood  
First term – Lecture No. 3 & Lecture Name (Suction Unit-part2)



Bled valve, a hole at proximal end of catheter to avoid reduced capacity, it can be blocked by a finger if required to increase suction pressure.

### Control system of the apparatus:

The following control systems may be used in suction apparatus:

**1. Cut off valve:** when the level of liquid reaches to a certain limit, it will shut off connecting with suction source to avoid liquid entering pump and causing it failure.

**2. Bacterial filter:**

- ☐ Best placed between the reservoir and pump to prevent spread of infection.
- ☐ Should change at regular intervals.
- ☐ Sterilizing liquid may be used in reservoir.

**3. Vacuum control valve:** To decrease degree of vacuum as a bled valve places between reservoirs and pump.

**4. Vacuum gauge:** Calibrated by mmHg from 0-760 fitted to tubing between vacuum central valve and reservoir on the top of reservoir itself.

**5. A stop valve:** when a pump gives low displacement, the valve used to occlude delivery tube.

### Operation of suction unit

Suction applies negative pressure, which is any pressure less than atmospheric pressure (760 mmHg, 100kPa), to allow for the movement of fluids or substances. The suction developed by the machine will be measured as a pressure. The common units of pressure are millimeters of mercury (mm Hg) or pascals (Pa or kPa).



