

General

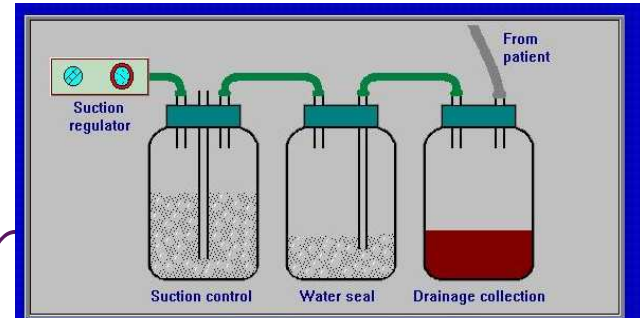
- Instead of regulating the level of suction with a column of water, the dry suction units are controlled by a self-compensating regulator. A dial to set the suction control setting is located on the upper left side of each unit.
- To set the suction setting, rotate the dial until the red stripe appears in the semi-circular window at the prescribed suction level and clicks into place.

Features:

- Dry suction control systems provide many advantages:
 - higher suction pressure levels can be achieved,
 - set-up is easy,
 - no continuous bubbling provides for quiet operation, and
 - there is no fluid to evaporate which would decrease the amount of suction applied to the patient.
 - positive pressure relief valve that opens with increases in positive pressure, preventing pressure accumulation. Normally, air exits through the suction port. Obstruction of this route (i.e. a bed wheel rolls on top of the suction tube, or the suction port is capped after suction discontinued) could cause accumulation of air in the system leading to tension pneumothorax. This safety feature allows venting of the positive pressure automatically, thus minimizing the risk of tension pneumothorax.

dry suction control

3-bottle system



THREE-BOTTLE SYSTEM

When suction is turned on, air and fluid are pulled out of the pleural space and into the drainage collection bottle. Suction is applied through the entire system until it reaches the pressure that will draw atmospheric air in through the open tube of the suction control bottle. When the incoming atmospheric air reaches the lower end of the tube, it bubbles into the bottle. At this point, the desired suction level will be maintained as any increase in suction will just draw in more atmospheric air.

General:

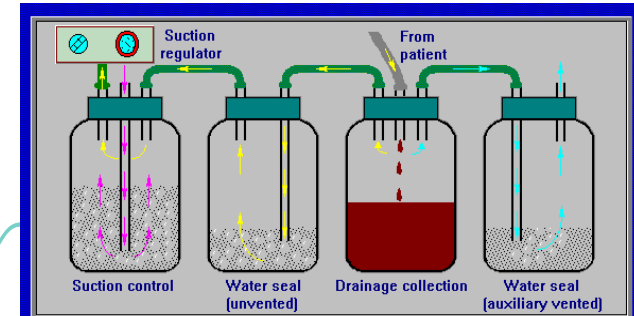
- Any drainage from the chest flows into this chamber.

Features:

- The collection chamber is calibrated and has a write-on surface to allow for easy measurement and recording of the time, date, and amount of drainage

collection chamber

4-bottle system



FOUR-BOTTLE SYSTEM

The four-bottle chest drainage system adds an auxiliary vented water seal bottle, as pictured above. This fourth chamber serves as a positive pressure safety relief valve should the suction become inoperative or if the suction tubing becomes occluded or kinked. In addition, it is a second water seal and manometer, estimating negative pressure in the drainage bottle and pleural space.

pleural drainage systems

General

- The main purpose of the water seal is to allow air to exit from the pleural space on exhalation and prevent air from entering the pleural cavity or mediastinum on inhalation.
- To maintain an effective seal, it is important to keep the chest drainage unit upright at all times and to monitor the water level in the water seal to check for evaporation.

under water seal

wet suction control

General:

- Traditional chest drainage units regulate the amount of suction by the height of a column of water in the suction control chamber.
- [Note: it's the height of water, not the setting of the suction source, that actually limits the amount of suction transmitted to the pleural cavity. A suction pressure of 20 cm H₂O is commonly recommended.]
- Connect the short suction tubing to a suction source, and adjust the source suction to produce gentle bubbling in the suction control chamber. Increasing suction at the suction source will increase airflow through the system, but will have minimal effect on the amount of suction imposed on the chest cavity.
- Excessive source suction not only causes loud bubbling (which can disturb patients), but also hastens evaporation of water from the suction control chamber. This results in a lower amount of suction applied to the patient as the level of water decreases.

Features:

- Bubbling in the water seal chamber indicates an air leak.
- The patient air leak meter (if present) indicates the approximate degree of air leak from the chest cavity
- The water seal chamber also has a calibrated manometer to measure the amount of negative pressure within the pleural cavity.
 - If there is no air leak, the water level should rise and fall with the patient's respirations, reflecting normal pressure changes in the pleural cavity. During spontaneous respirations, the water level should rise during inhalation and fall during exhalation. If the patient is receiving positive pressure ventilation, the oscillation will be just the opposite
- At the top of the water seal chamber is a high negativity float valve and high negativity relief chamber. These safety features maintain the water seal in the event of high negative pressures.

Three situations can cause high negative pressure:

 - The patient in respiratory distress, coughing vigorously, or crying;
 - Chest tube stripping;
 - Decreasing or disconnecting suction .