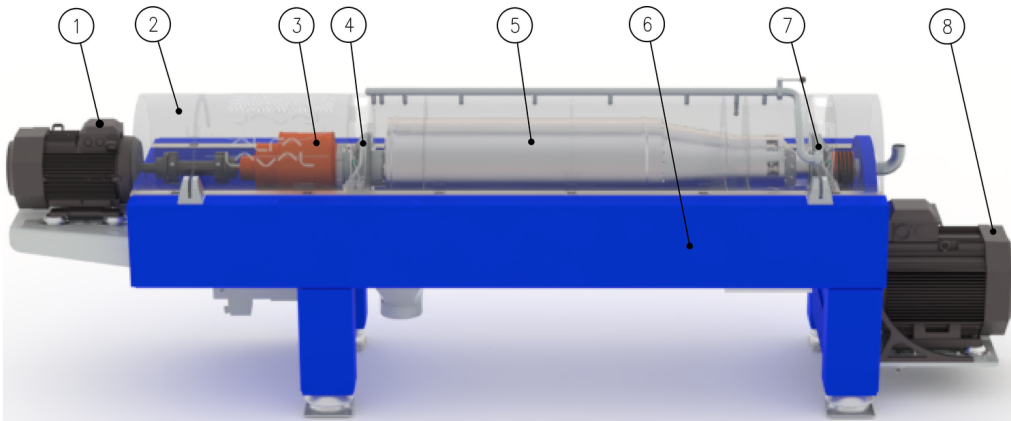


5 Operation

5.1 Decanter Operating Principle

A decanter is a centrifuge for separation of suspensions of solid matter and one or two liquids with different densities into separate liquid and solid phases.

The main components of a decanter centrifuge are the bowl [5], the conveyor, the gearbox [3], the frame with the casing [6], and the feed and the discharge arrangement.



The bowl consists of four main parts. A large end hub, a cylindrical section, a conical section and a small end hub. The main bearings [4] & [7] and the bearings for the conveyor, the drive pulley and the gearbox adapter are located on the end hubs..

The conical section has openings for solids discharge.

The discharge openings are in most cases lined with replaceable bushings or liners made from abrasion resistant material such as Stellite or tungsten carbide material.

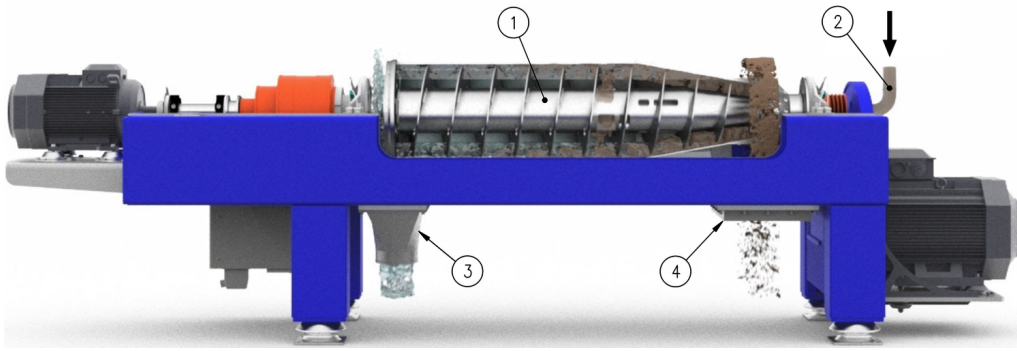
The large end hub has openings for liquid discharge.

Some decanters have pressurized liquid discharge by means of a paring disc, a centripetal pump, placed outside the large end hub.

A feed tube protrudes into the bowl along its rotational axis and on the bottom side of the frame there are outlets for liquid and solids phases.

A cover protects the rotating parts and collects the separated phases.

Fitted onto the frame are an electric main drive motor [8] driving the bowl through a belt drive and most commonly another back drive motor [1] driving the conveyor through the gearbox.



The media to be processed enters the bowl through the feed tube [2].

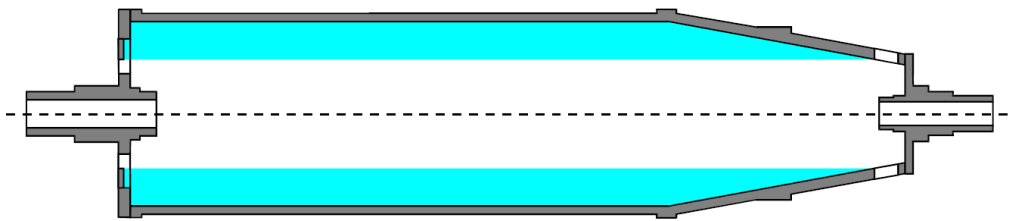
Due to the centrifugal force created by the rotation of the bowl, the feed is accelerated into the pond.

The centrifugal force makes the heavier particles (solids) settle at the inner wall of the bowl. The conveyor [1] rotates slowly relative to the bowl (the differential speed) and thus solids are conveyed towards the conical end of the bowl and out through the solids discharge openings in the small end of the conical bowl section. and exits the decanter from the solids discharge funnel [4].

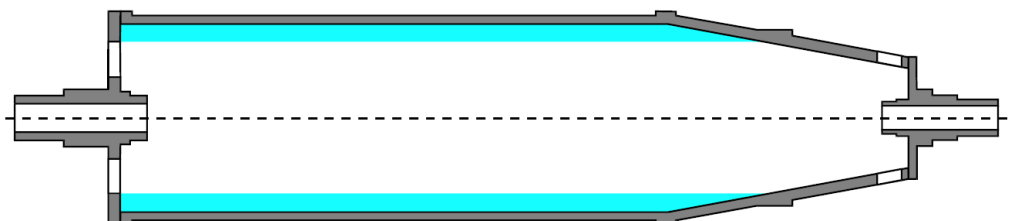
The liquid flows in the opposite direction. Separation takes place throughout the total length of the cylindrical section of the bowl, and the clarified liquid leaves the bowl at the large end hub end and exits the decanter from the liquid funnel [3] underneath the frame.

If the liquid consists of two not miscible liquids (e.g. water and oil), there are decanter versions available with two liquid outlets, one for each liquid phase.

The volume, inside the bowl, occupied by liquid and solids is named the pond. The depth of the pond is determined by exchangeable and/or adjustable dam plates or tubes in the large end hub.



Small liquid radius (deep pond, short beach)



Large liquid radius (shallow pond, long beach)

The liquid level is the distance from the rotational axis of the bowl to the surface of the pond. Hence it is this radius which is used for dam plates or tubes to define the position of the surface of the pond.

The distance from the rotational axis of the bowl to the solids outlet is the solids discharge radius or the solids outlet level.

When the liquid level is the same as the solids discharge radius, the liquid level is neutral.

When the liquid level is higher than the solids discharge radius, the liquid level is positive.

When the liquid level is lower than the solids discharge radius, the liquid level is negative. This requires a baffle disc, and when running a decanter in this mode, the differential speed must be kept low so that the solids make a barrier to prevent the liquid from leaving the bowl in the solids discharge end.