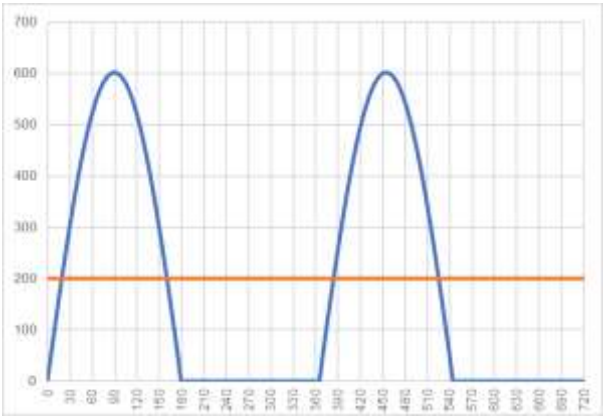
Action of the Air Vessel



The intended pump output is 200 Gallons per minute. (Red Line)

One revolution of the pump is 360^{o} but, because the pump has only one piston, all the discharge takes place in one half of the rotation (180^{o}).

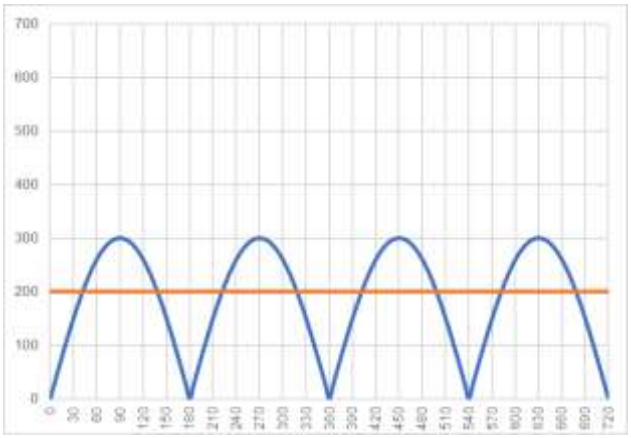
Nothing is discharged during the second half of the rotation as the piston returns to the start.

This makes the flow in the discharge pipework very uneven (Blue Line)

The wide range of flow causes excessive wear and tear on the pump and pipework.

So, to reduce the variation, a plunger is fitted to the piston rod. This can be seen behind the grilles on the pump rod guides.

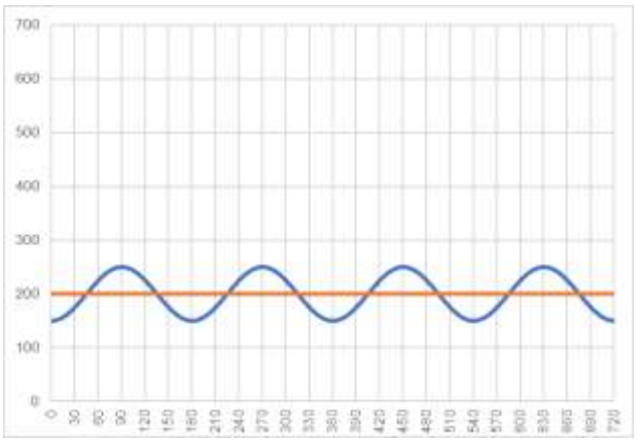
As the plunger moves in and out of the pump cavity, it stores half the flow during the first half rotation and discharges it during the second half rotation.



This graph show how much the plunger reduces the variation in flow from the pump.

Notice especially that the peak flow has been reduced by half.

This allows smaller pipework to be used between the pump and the storage tank on the roof, and saves energy.



To further reduce wear and tear on the pipework, an air vessel is added.

On the pump discharge stroke, some of the brine flows into the vessel, compressing the air inside.

As the pump discharge reduces, the air pressure pushes the stored brine out again.

The pump flow still varies, but the flow variation in the pipework is further reduced