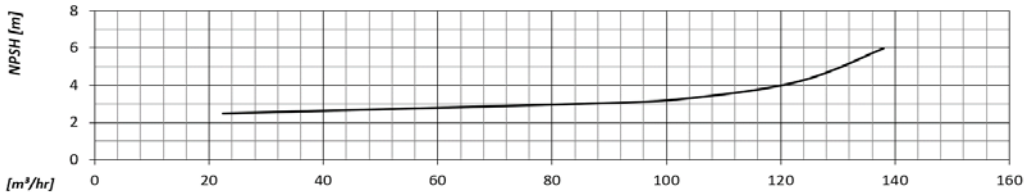
Minimum Submergence

A submersible borehole/well pump must be submerged at all times.

The pump suction intake must be sufficiently submerged to prevent cavitation and avoid the formation of vortexes being created on the liquid being pumped.

When a vortex forms, this can cause air to mix with the water being pumped, causing possible cavitation and reduce the pump capacity and can lead to internal damage of the impellers and bowls.
To avoid free surface vortex formation, you would use the minimum submergence figure recommended by the manufacturer in their charts.

An approximate way to determine the submergence value for a submersible turbine pumps can be based from the NPSH curve;



Identify the flow rate you require and go up the graph to the NPSH curve/line.

Examples:
At the nominal flow rate of 80 m³/h the NPSH is 3 metres.

Now use the 3 metres and subtract atmospheric pressure of 9.81 metres.
The result is a negative figure which is not acceptable for a pump intake.

NPSH(M) - G(M) + 1M = minimum submergence
NPSHr = Net Positive Suction Head required. G = head of atmospheric pressure. M = metre
If the value calulated is less than zero metres, for our submersible pumps we would recommend a minimum submergence 'Y' of 1 metre.

If the value calculated is above zero, use that figure and add 1 metre

Example: If the NPSH curve shows 12 metres, subtract 9.81 metres which equals 2.2 metres, so the recommened minimum submergence 'Y' would be 3.2 metres. In our charts we would likely state 'Y' as being 3.5 or even 4 metres.

Note:
Minimum submergence is considered from the bottom of the suction strainer for submersible pumps and from the bottom of the suction bell for vertical line shaft turbine pumps.