

NET POSITIVE SUCTION HEAD

Net Positive Suction Head combines all factors linking the suction side of a pump: Internal pump losses, static suction lift, friction losses, vapour pressure and atmospheric conditions. It is important to differentiate between NPSH available and required.

The Net Positive Suction Head available is the total suction head available from a fluid system and takes into account the:

- > Static height of the liquid column above or below the centre hole
- > Frictional losses generated in the pump system of the desired flow
- > The vapour pressure of the liquid at the temperature it is to be pumped

All Calculations are normally based on absolute pressures and use the pump centreline as a datum.

NPSHA

$H_a - H_{vpa} - H_{fs}$ (for negative suction lift applications)

or $H_a - H_{vpa} + H_{st} - H_{fs}$ (for positive gravity fed applications)

H_a = Absolute pressure acting on the surface of the liquid at the supply level, (this will be the barometric pressure of the supply is from a vented open tank or sump or the absolute pressure existing if the tank is closed such as occurs in vacuum systems or condensers and deareaters)

H_{vpa} = The vapour pressure of the liquid at the pumping temperature

H_{st} = The static height of the Liquid column above (+) or (-) below the pump centreline (impeller eye)

H_{fs} = All suction line friction losses generated by the pipe and valve system supplying the pump including items such as strainers and filters and including entry losses in the pump.

The NPSH requirements of a pump are determined by the actual design of the pump and incorporates many

factors. In type of suction inlet impeller design, pump flow rate, rotational speed etc. and is normally provided as a figure by the pump supplier.

For a pump system to operate it is essential that the NPSH available (NPSHA) from a system exceeds the NPSH required (NPSHR) by the pump to be employed.

If ever the NPSHR exceeds the NPSHA the system will not work, liquid not being able to access the pump at the required rate and cavitation will occur causing damage to the pump and/or the system.. In all calculations all components should be expressed in common units. Our technical staff will be pleased to undertake NPSH calculations for your applications.

