



SERFILCO® 'NPSH' NET POSITIVE SUCTION HEAD

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An understanding of net positive suction head (NPSH) is necessary to avoid poor application of centrifugal pumps. NPSH combines all factors limiting the suction side of the pump. It is wise to be concerned with NPSH if one of the following conditions is present:

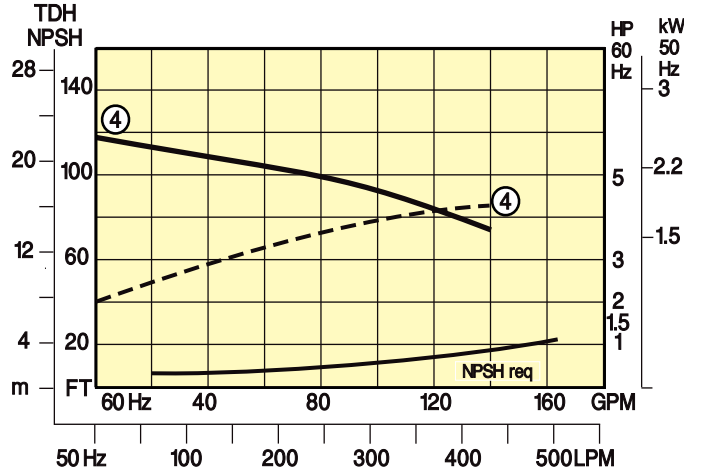
- High flow and low head relationship
- High temperature
- High elevation above sea level
- Restricted suction (high friction loss)
- Low static suction head (liquid level above pump)
- High suction lift (liquid level below pump)
- High vapor pressure of solution

REQUIRED NPSH — Refers to internal pump losses. It is determined by the pump manufacturer's laboratory tests. The greater the pump's capacity, the greater the required NPSH.

For a specific TDH and GPM requirement on a pump curve, the corresponding required NPSH is directly below and read off the left ordinate of flow curves.

AVAILABLE NPSH — The net positive suction head above the vapor pressure which is available at the suction flange of a pump to maintain a liquid state.

Available NPSH must always exceed required NPSH.



To determine the **available NPSH** in a system, deduct the negative factors from the positive factors. All values are to be in feet, with consideration for specific gravity.

POSITIVE FACTORS

Static suction head	at operating temperature
Atmospheric pressure (if open tank)	Friction losses
Positive pressure (if pressurized tank)	Static suction lift (including specific gravity)
NEGATIVE FACTORS	
Vapor pressure (PSIA)	

minus

EXAMPLES

Model HE2x1½ with No. 4 impeller will flow 140 GPM@62 ft. TDH. The required NPSH is 17 ft.

EXAMPLE A If a pump is connected by a 2" suction pipe one foot long, to the bottom of a 6 ft. deep tank in Chicago, Illinois (500 ft. elevation), and the tank contains water at 70°F, what is the **available NPSH**?

	POSITIVE		NEGATIVE	
	Static suction head	6'	Vapor pressure	.8'
	Atmospheric pressure	33'	Friction losses	.6'
	<u>Total</u>	<u>39'</u>	<u>Total</u>	<u>1.4'</u>
39' - 1.4' = 37.6' available NPSH				

Since the required NPSH is 17 ft., the pump will perform satisfactorily. (Note, if the pump were "hosed" over the side of the tank, static suction head would be the same, but friction losses would increase).

EXAMPLE B If a pump is connected by a 2" suction pipe 10 ft. long, with 3 elbows, near the top of a 6 ft. deep tank in Denver, Colorado (5,000 ft. elevation), and the tank contains water at 170°F, what is the **available NPSH**?

	POSITIVE		NEGATIVE	
	Static suction head	1'	Vapor pressure	13.8'
	Atmospheric pressure	28'	Friction losses	16.0'
	<u>Total</u>	<u>29'</u>	<u>Total</u>	<u>29.8'</u>
29' minus 29.8' = none available				

Since the required NPSH is 17 ft. and none is available, the pump will experience a reduction in capacity, loss of efficiency, noise, vibration and cavitation. Net answer: This is a poor application.



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