

## LES170 and LES190 Recommended suction pipe layout

### ➤ Suction from tank bottom, e.g. CIP return

Suction line should, if possible, installed with a slight slope (for example 2%) towards the pump.

**Aim: complete emptying of the tank and the suction line!**

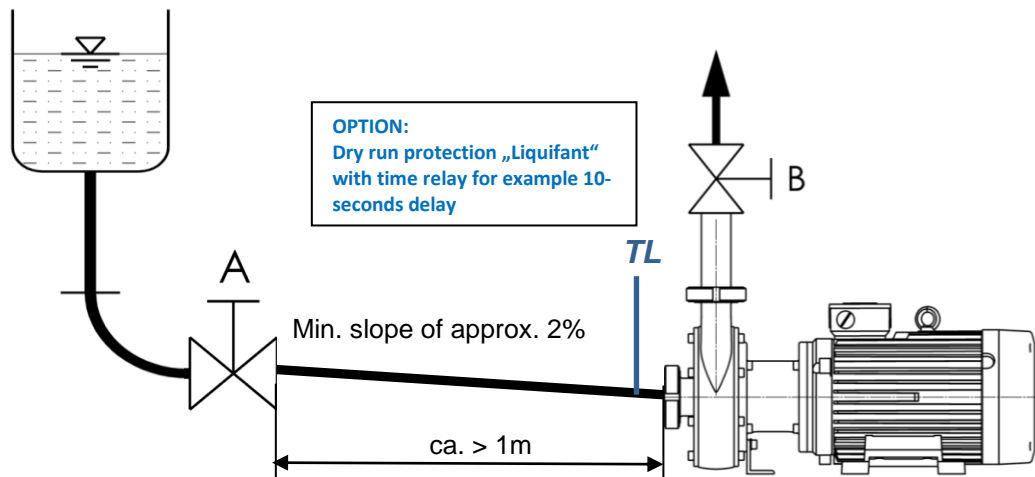


Figure 1: excellent upstream conditions

If possible use slight slope of > 2%

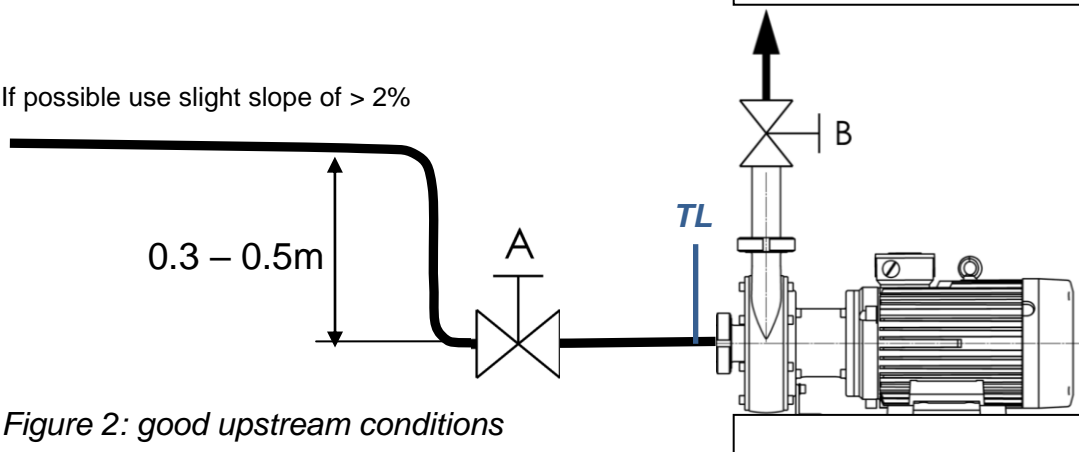


Figure 2: good upstream conditions

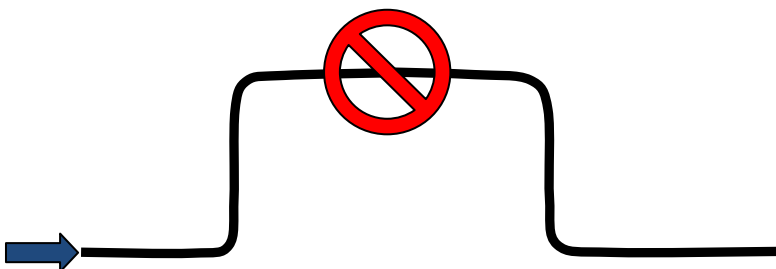
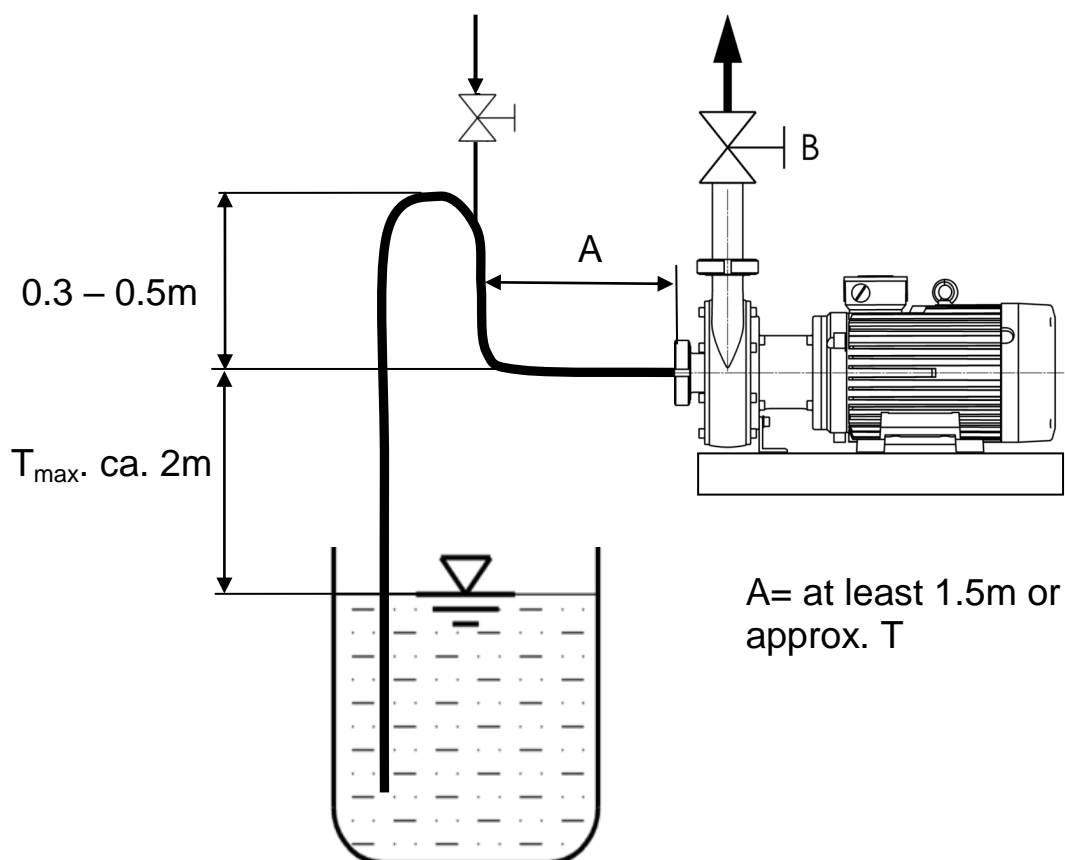
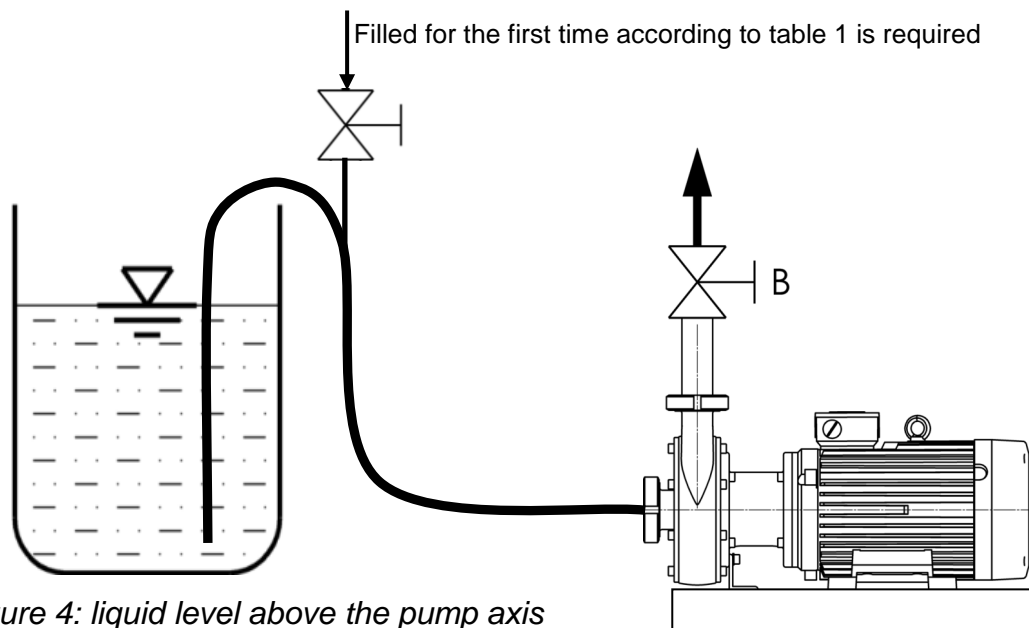


Figure 3: An "up and down" of the suction line should be avoided!

➤ suction from top of the tank



The **recommended minimum filling volume V** in the suction line should be selected so, that the pump as well as approx. 2-3m of the suction line are completely filled with liquid:

DN	mm	50	65	80	100
V/m	liter/m	2	3.3	5.0	7.9
Length filled	m	2.5	2.5	2	2
filling volume V	liter	>5	>8	>10	>16

Table 1:

As a guide:

Available volume of liquid should be approx. 1.5 - 2.5 times larger than the volume of air in the suction line. Figures 4 and 5: if the suction line is for example 6m long, 3-4m of the suction line and the pump should be filled with liquid.

## Recommended sizes of suction line:

Example: flow rate approx. 27m<sup>3</sup>/h → DN65 preferred

Q m <sup>3</sup> /h	<20	<30	<50	<80	
	Flow velocity				
DN 50	2.8				m/s
DN 65	1.7	2.5	4.2		m/s
DN 80	1.1	1.7	2.8		m/s
DN 100				2.8	m/s

Table 2:

If a large amount of air is to be conveyed during suction, it is important to ensure that a sufficiently high flow velocity is reached in the suction line. This flow velocity can then also be greater than usual.

Otherwise, an accumulation of air in the upper half of the line cross-section threatens to prevent a friction-free operation

A suction flow velocity of <1.5 m/s is still the reference value for standard applications.

Example for the eccentric reduction or extension of the suction line to DN80 (DN80 is the standard diameter for the LES170 and LES190 to 60m<sup>3</sup>/h):

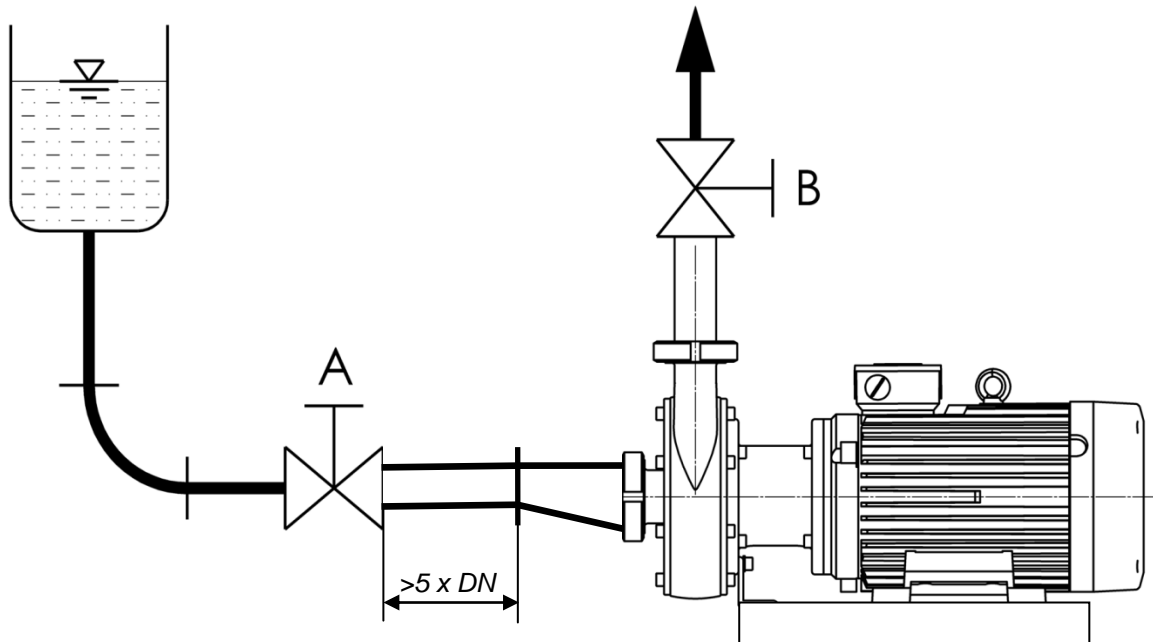


Figure 6: the eccentric cone should open downwards

For flow rates higher than 60m<sup>3</sup>/h a suction nozzle DN100 should use resp. DN125 for flow rates > 90m<sup>3</sup>/h.

A bad suction pipe arrangement is shown below with Figure 7.

e.g. unloading of tank trucks

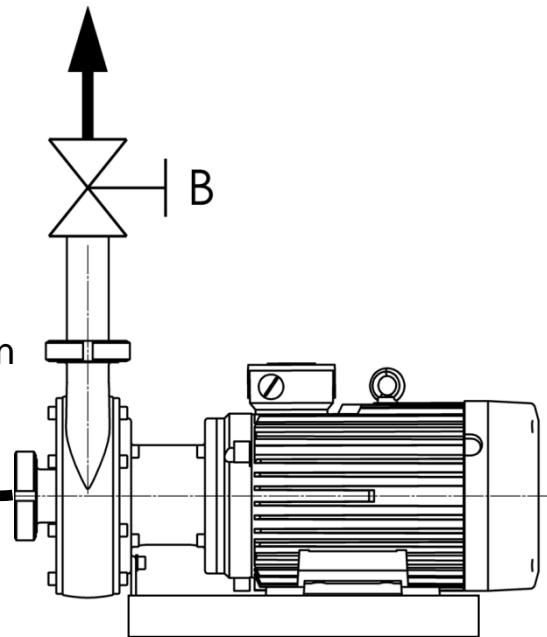
### Bad situation:

A suction line below the pump axis is very bad especially at the end of the pumping process when a large proportion of air is present in the flow because the pump is going to drain/ emptying itself.

e.g. flexible tube



Figure 7:



### Better:

e.g. flexible tube

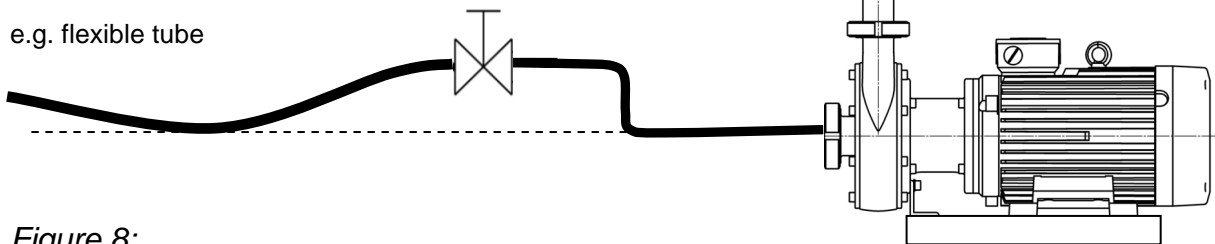


Figure 8:

The flexible tube should be stretched as far as possible and should not lie below the pump axis. If this is not possible, a certain pipe section above the pump axis should be installed directly in front of the pump.