

# Standard Pumps Optimizing Tubing Performance

There are two types of liquid transfer lines in a typical system: **RESERVOIR** and **DELIVERY**.

**RESERVOIR** lines transfer liquid from a vessel to the input port of the pump.

**DELIVERY** lines transfer liquid from the output pump port to another location (i.e., cuvette or test tube).

When selecting liquid lines, follow the below parameters:

## Tubing I.D.

**SUCTION** Line I.D. - Too small will restrict flow causing the pump to cavitate.  
- Too large will generate additional priming requirements.

**DELIVERY** Line I.D. - Too small will cause additional back pressure and excessive liquid velocity.  
- Too large will introduce backpressure, increasing the pressure at the pump.

## Tubing Length

**RESERVOIR** Line - Excessive length may prevent the pump from priming and introduce pressure drop that will restrict flow to the pump.

**DELIVERY** Line - Excessive length will introduce backpressure, increasing the pressure at the pump.

## Tubing Material

**RESERVOIR** Line - Soft tubing (PVC) may collapse and pulse, causing flow restriction, blockage and pump cavitation.

**DELIVERY** Line - Soft tubing may expand and pulse, causing flow fluctuations, undermining the system's C.V.  
- Semi rigid tubing, (FEP/LDPE) is preferred for consistent performance of the liquid transfer system.

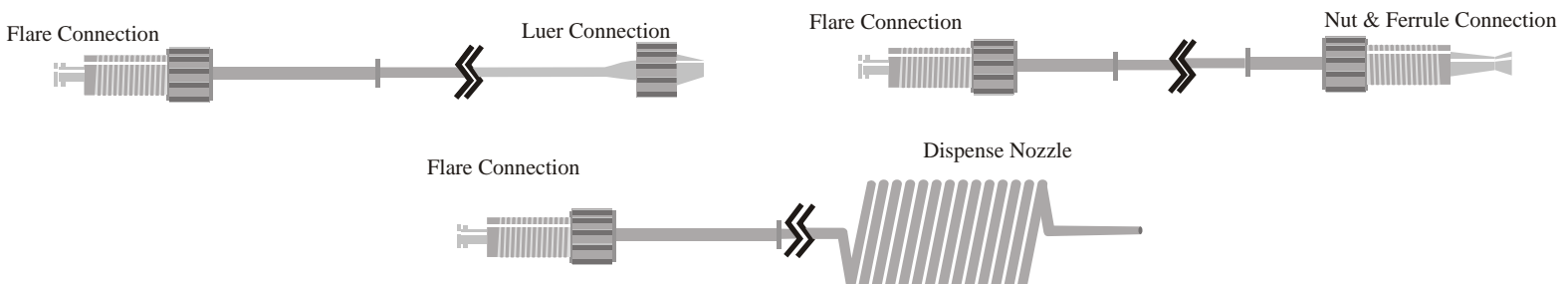
## Port Connection

**RESERVOIR** Line - Should be bubble tight to prevent introduction of micro-air bubbles into the pump input port.

**DELIVERY** Line - Should be bubble tight to prevent leakage of liquid from the pump output port.

Zero Dead Space - Configurations should be used to prevent particle entrapment and minimize flow turbulence.  
Particle entrapment may cause material to carry-over contamination. Flow turbulence may cause additional backpressure, effecting system performance.

Typical Configurations



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