

# Transferring Non-Aqueous Liquids

## Viscosity

**Problem:** Viscous liquids have a high resistance to flow (e.g. glycerol).

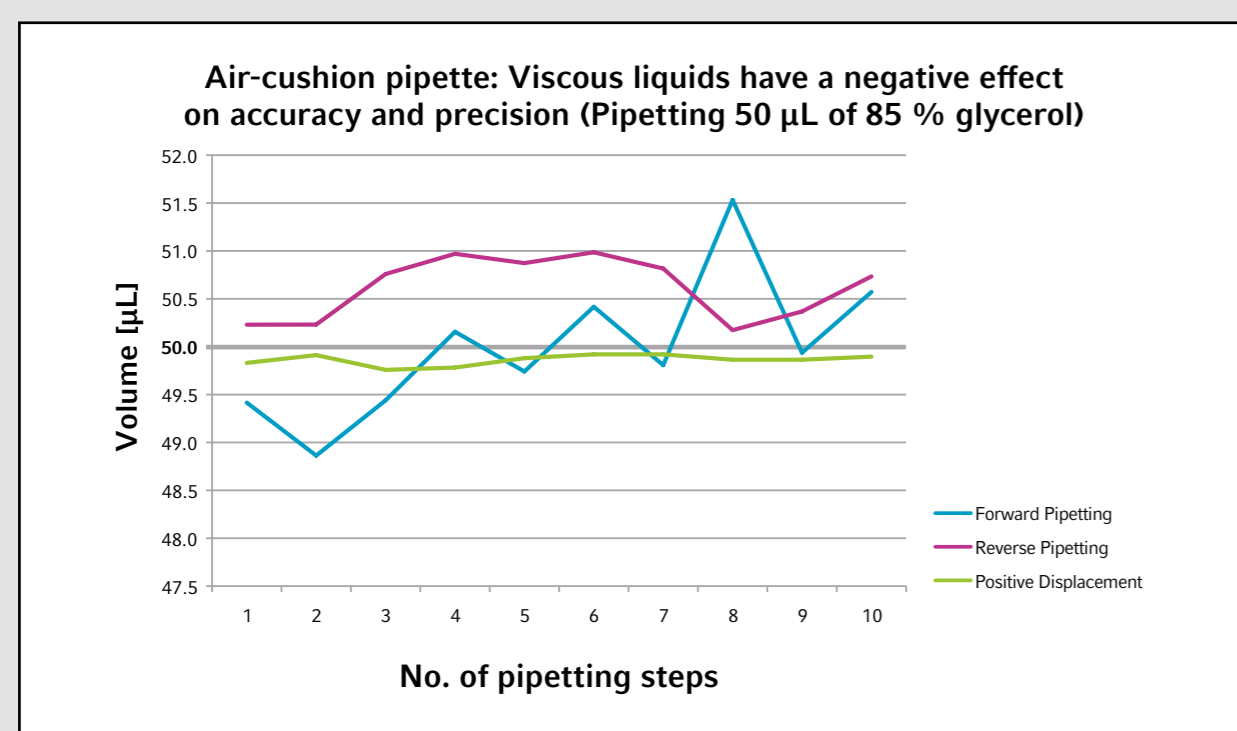
**Observation:** a) unknown time until liquid has fully risen in tip b) liquid residues stay attached to tip wall.

**Prevention air-cushion pipette:**

- > Work slowly
- > Reverse pipetting

**Recommendation positive displacement:**

Sealing lip of piston wipes tip clean.



## Density

**Problem:** The liquid's density influences the size of air cushion (e.g. ethanol).

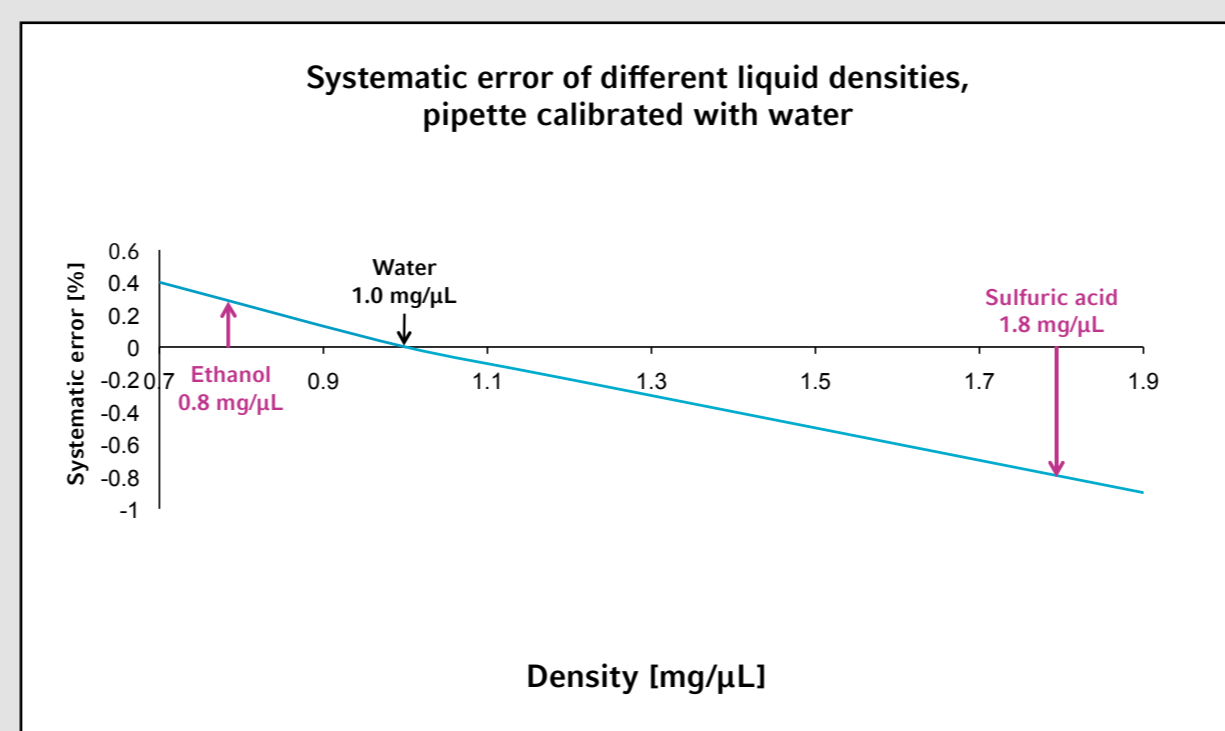
**Observation:** Too low / too high volume is pipetted.

**Prevention air-cushion pipette:**

- > Adjust pipette to liquid (becomes fixed-volume pipette for adjusted volume)

**Recommendation positive displacement:**

No air cushion therefore no problem.



## Vapour pressure

**Problem:** Liquids with high vapour pressure force air cushion to expand (e.g. acetone).

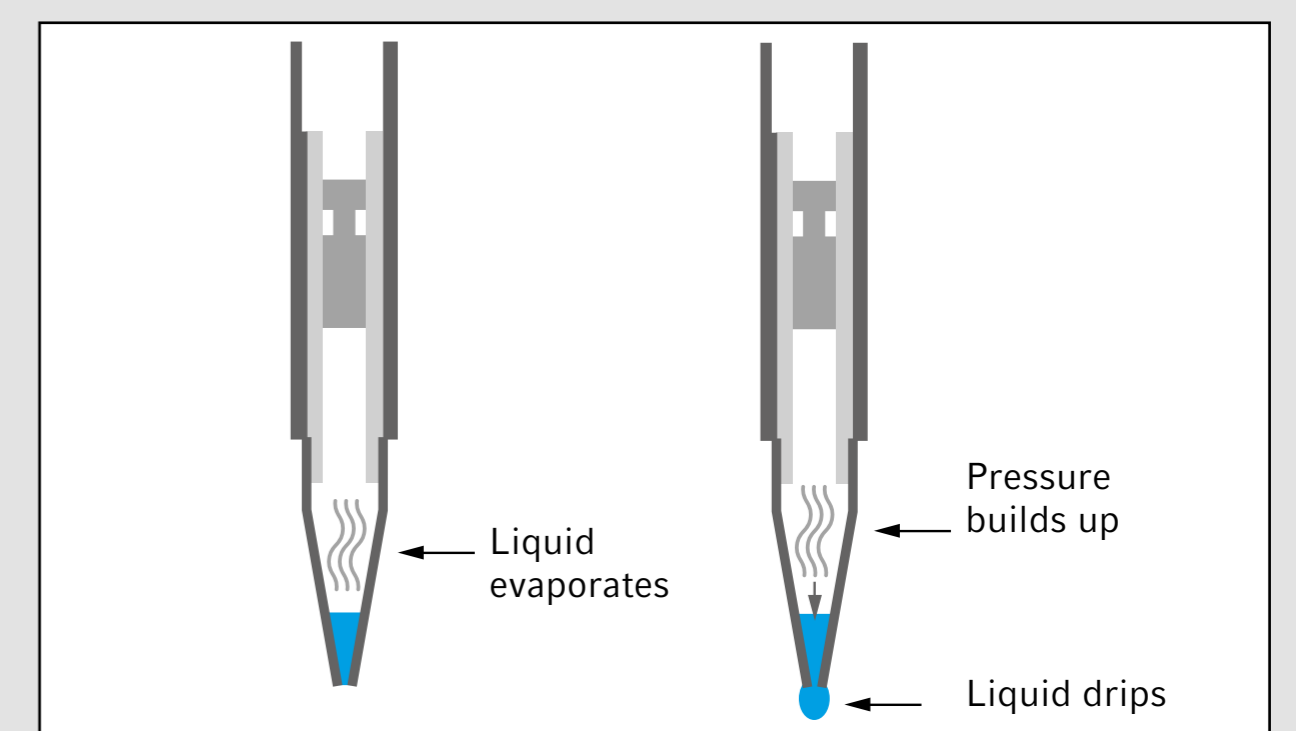
**Observation:** The pipette drips.

**Prevention air-cushion pipette:**

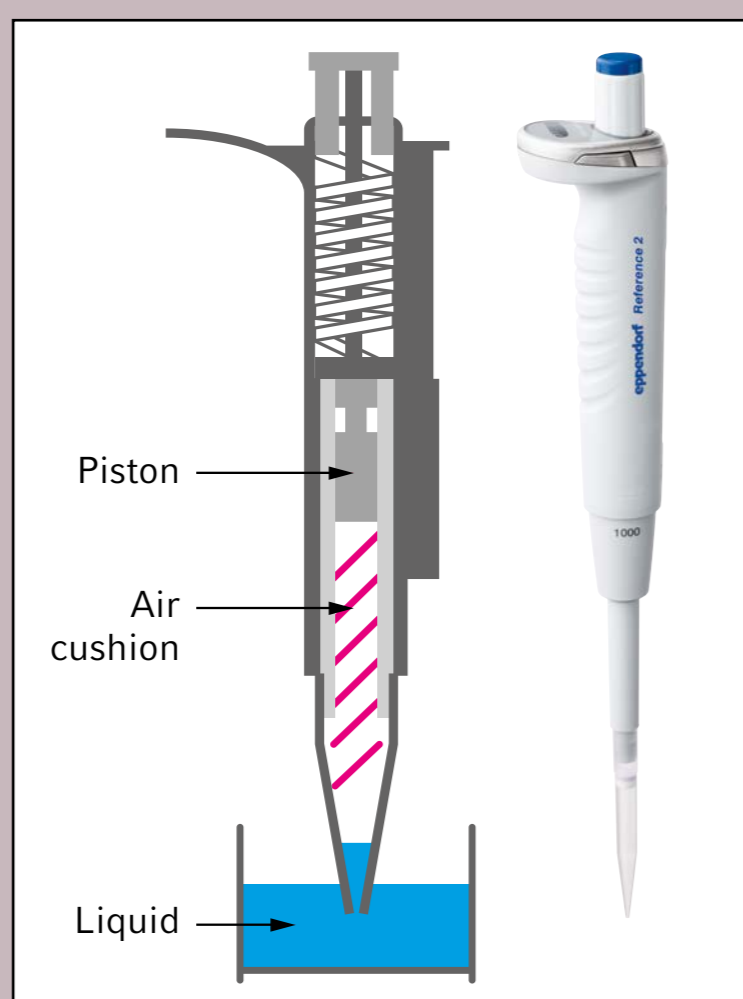
- > Prewet at least 5 times
- > Reverse pipetting (better accuracy, but dripping still occurs)

**Recommendation positive displacement:**

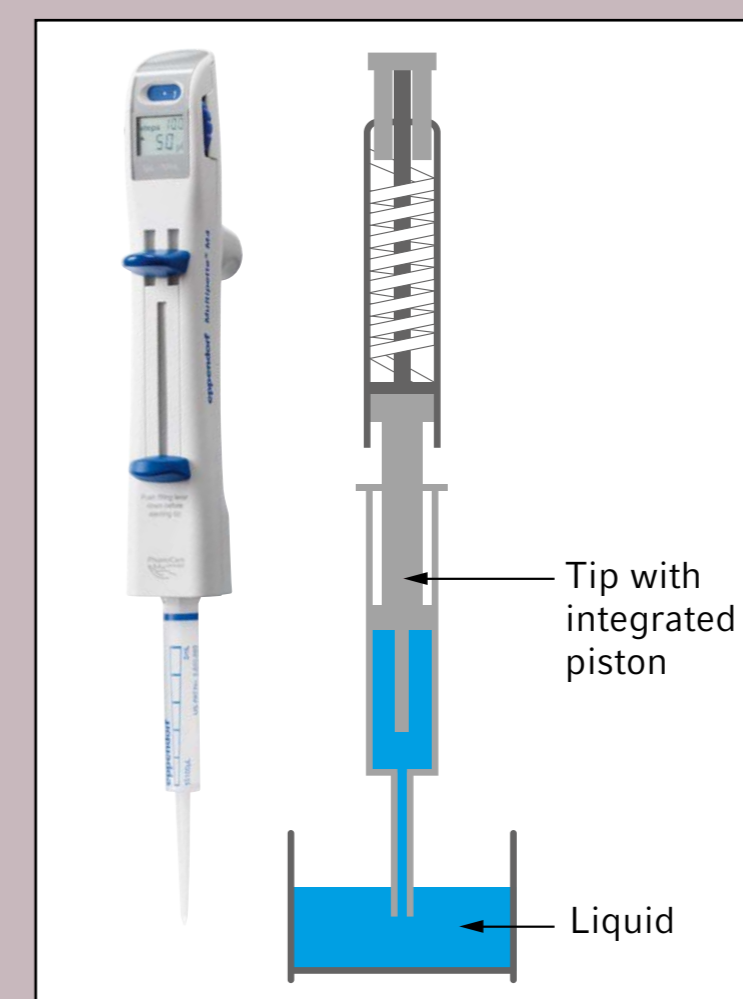
No air cushion therefore no problem.



**Air-cushion principle:**  
Air cushion separates the liquid from the piston



**Positive-displacement principle** (dispenser e.g. Multipipette®) vs. **Air-cushion principle** (pipette e.g. Eppendorf Reference® 2)



**Positive-displacement principle:**  
Liquid in direct contact with the piston → No air cushion

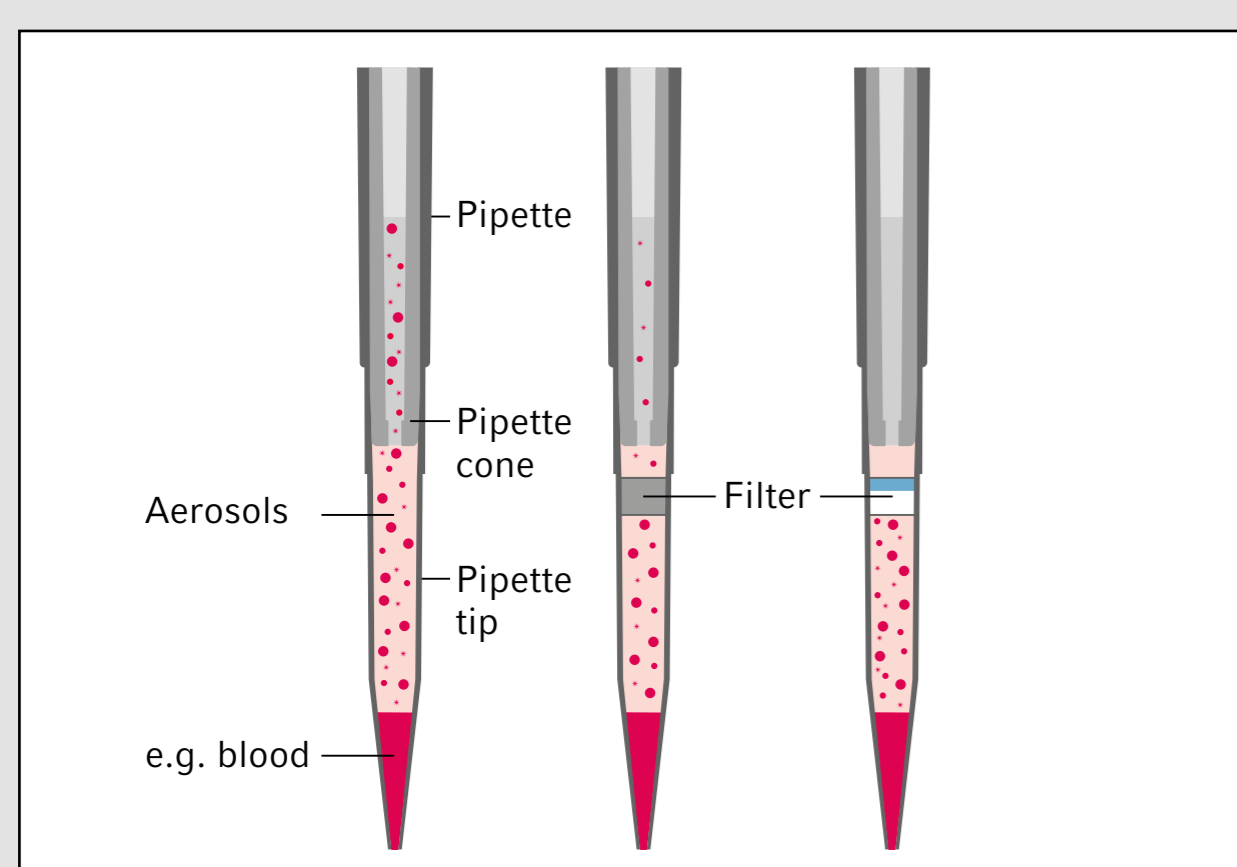
## Infectious / radioactive liquids

**Problem:** Aerosols may contaminate the pipette

**Prevention air-cushion pipette:** Use filter tips with high efficiency (e.g. ep Dualfilter T.I.P.S.®)

**Recommendation positive displacement:**

Liquids are safely enclosed in dispenser tip due to sealing lip of the piston.



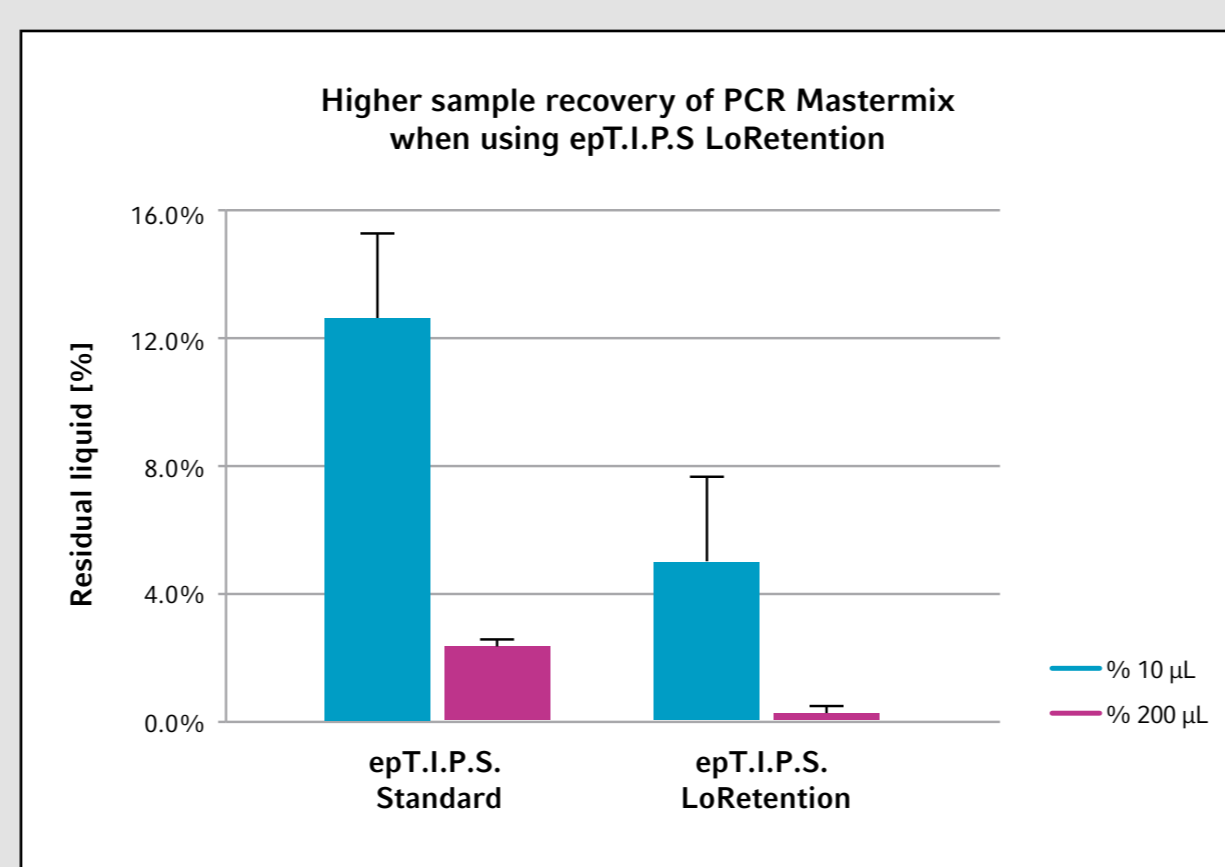
## Detergent containing liquids

**Problem:** Detergents lower the surface tension of water. Liquid residues stay in tip.

**Prevention air-cushion pipette:** Use tips with low retention effect (e.g. epT.I.P.S.® LoRetention).

**Recommendation positive displacement:**

Sealing lip of the piston wipes tip clean.



## Foaming liquids

**Problem:** Liquid foams when moved. It is difficult to pipette sample accurately.

**Prevention air-cushion pipette:** Reverse pipetting.

**Recommendation positive displacement:**

- > Reverse and residual stroke leave room for foaming
- > Sealing lip of the piston moves tip clean

