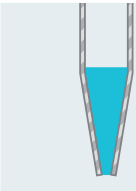

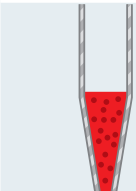
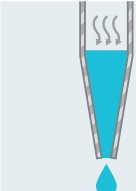

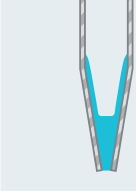
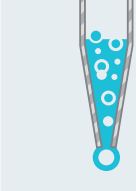




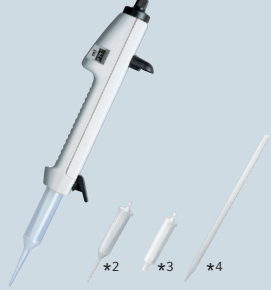



Master Any Type of Liquid

Type of Liquid		Potential problems	Workaround	Recommendations		
		Observations	Air-cushion pipettes	Positive displacement dispenser	Positive displacement pipettes	Bottletop dispenser and burets
Water		> Air-cushion pipettes are optimized to the physical properties of water	> Optimally suitable for the use of water > No adaptation necessary	> Serial pipetting for multiple samples and vessel formats	> Varitip S ^{*3,4} system allows accurate pipetting from large bottles and narrow vessels	> Liquid dispensing directly from supply bottles
Viscous e.g. glycerol, oil		> High resistance to flow > Liquid residues stay attached to inside tip wall > Imprecise results	> Work slowly > Reverse pipetting > Adjust to liquid type ^{*1}	> Higher precision regardless of physical properties of liquid > Serial dispensing > No adjustment to liquid type needed	> Varitip P ^{*2} allows accurate pipetting, for example from beakers	> Liquid dispensing directly from supply bottles (with Varispenser [®] 2/2x up to a viscosity of 500 mm ^{2/s})
Dense e.g. sulfuric acid, caesium chloride		> Influence on size of air-cushion > Dispensed volume too low or too high	> Adjust pipette to liquid density > Adjust to liquid type ^{*1}	> Higher precision regardless of physical properties of liquid > Serial dispensing > No adjustment to liquid type needed	> Varitip P ^{*2} allows accurate pipetting, for example from beakers	> Liquid dispensing directly from supply bottles up to a density of 2.2 g/cm ³
Volatile e.g. acetone, ethanol		> Air-cushion expands > Liquid drips out of the tip > Imprecise results	> Prewet at least 5 times > Reverse pipetting > Adjust to liquid type ^{*1}	> Higher precision regardless of physical properties of liquid > Serial dispensing > No adjustment to liquid type needed	> Varitip P ^{*2} allows accurate pipetting, for example from beakers > Varitip S system and valve for drip-free dispensing	> Liquid dispensing directly from supply bottles up to a vapor pressure of 500 mbar
Infectious / radioactive e.g. biohazard material		> Aerosols contaminate pipette > Threat to human health and sample safety	> Use filter tips > Automated systems protect user and sample	> Higher precision regardless of physical properties of liquid > Serial dispensing	> Varitip P ^{*2} allows accurate pipetting, for example from beakers	> Liquid dispensing directly from supply bottles
Detergent / detergent-containing e.g. Tween 20, Triton [™] X-100		> Reduced surface tension > Liquid residues stick to the inner wall of the tip > Imprecise results	> Use tips with low retention effect > Adjust to liquid type ^{*1}	> Higher precision regardless of physical properties of liquid > Serial dispensing	> Varitip P ^{*2} allows accurate pipetting, for example from beakers	> Liquid dispensing directly from supply bottles (with Varispenser [®] 2/2x up to a viscosity of 500 mm ^{2/s})
Foaming e.g. protein-containing liquids		> Foam is created > Liquid residues remain in the tip > Imprecise results	> Reverse pipetting	> Higher precision regardless of physical properties of liquid > Serial dispensing	> Varitip P ^{*2} allows accurate pipetting, for example from beakers	> Liquid dispensing directly from supply bottles



^{*1} This option is only available on automated systems and electronic pipettes
^{*2,3,4} See Varipette[®] 4720 for corresponding Eppendorf Varitips[®]

Eppendorf Solutions

Mechanical systems	Advantages > Easy to clean > Economical > Lightweight	> Eppendorf Research [®] plus > Eppendorf Reference [®] 2 > Research plus Move It [®] > Pipet Helper [®] 	> Multipette [®] M4 	> Varipette [®] 4720 	> Varispenser [®] 2/2x for dispensing large volumes 
Electronic systems	Advantages > High reproducibility > Ergonomic working > Multifunctionality	> Eppendorf Xplorer [®] (plus) > Pipette Manager > Xplorer plus Move It [®] > Easypet [®] 3 > epMotion [®] 	> Multipette [®] E3/E3x 		> Eppendorf Top Buret for titration 