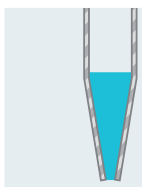
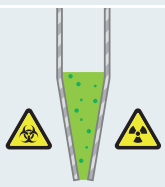
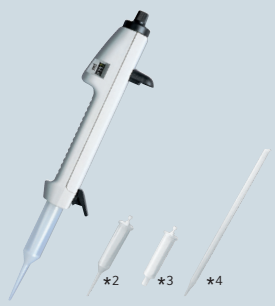
Master Any Type of Liquid

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 mm²/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/cm³
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 mm²/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 

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