







# Master Any Type of Liquid

Type of Liquid		Water	Viscous e.g. glycerol, oil	Dense e.g. sulfuric acid, caesium chloride	Volatile e.g. acetone, ethanol	Infectious / radioactive e.g. biohazard material	Detergent e.g. Tween 20, Triton™ X-100	Foaming e.g. protein-containing liquids	Eppendorf Solutions	
		Mechanical pipettes	Electronical pipettes							
Potential problems	Observations	> Air-cushion pipettes are optimized to the physical properties of water	> High resistance to flow > Liquid residues stay attached to inside tip wall > Imprecise results	> Influence on size of air-cushion > Dispensed volume too low or too high	> Air-cushion expands > Liquid drips out of the tip > Imprecise results	> Aerosols contaminate pipette > Threat to human health and sample safety	> Reduced surface tension > Liquid residues stick to the inner wall of the tip > Imprecise results	> Foam is created > Liquid residues remain in the tip > Imprecise results	<b>Advantages</b> > Easy to clean > Economical > Lightweight	<b>Advantages</b> > High reproducibility > Ergonomic working > Multifunctionality
	Prevention	Air-cushion pipettes	> Optimally suitable for the use of water > No adaptation necessary	> Work slowly > Reverse pipetting > Adjust liquid type*1	> Adjust pipette to liquid density > Adjust liquid type*1	> Prewet at least 5 times > Reverse pipetting > Adjust liquid type*1	> Use filter tips > Automated systems protect user and sample	> Use tips with low retention effect > Adjust liquid type*1	> Reverse pipetting	> Eppendorf Research® plus > Eppendorf Reference® 2 > Pipet Helper® 
Recommendations	Positive displacement dispenser	> Serial pipetting for multiple samples	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Higher precision regardless of physical properties of liquid > Serial pipetting	> Multipette® M4 	> Multipette® E3/E3x 
	Positive displacement pipettes	> Varitip S*3,4 system allows accurate pipetting from large bottles and narrow vessels	> Varitip P*2 allows accurate pipetting, for example from beakers	> Varitip P*2 allows accurate pipetting, for example from beakers	> Varitip P*2 allows accurate pipetting, for example from beakers > Varitip S system and valve for drip-free dispensing	> Varitip P*2 allows accurate pipetting, for example from beakers	> Varitip P*2 allows accurate pipetting, for example from beakers	> Varitip P*2 allows accurate pipetting, for example from beakers	> Varipette® 4720 	
	Positive bottletop dispenser	> Liquid dispensing directly from supply bottles	> Liquid dispensing directly from supply bottles up to a viscosity of 500 mm <sup>2</sup> /s	> Liquid dispensing directly from supply bottles up to a density of 2.2 g/cm <sup>3</sup>	> Liquid dispensing directly from supply bottles up to a vapor pressure of 500 mbar	> Liquid dispensing directly from supply bottles	> Liquid dispensing directly from supply bottles up to a viscosity of 500 mm <sup>2</sup> /s	> Liquid dispensing directly from supply bottles	> Varispenser® 2/2x 	> Eppendorf Top Buret™ 

\*1 This option is only available on automated systems and electric pipettes  
\*2,3,4 See Varipette® 4720 for corresponding Eppendorf Varitips®