

Appendix 3. Acids and guidelines for their dilution

The two tables in this Appendix provide information on acids commonly used in the book. Table App. 3.1 deals with the usual properties of four concentrated acids, while Table App. 3.2 provides information on approximate molarities for a range of dilutions. Note that these acids may be marketed with different chemical concentrations, which should be taken into account.

Dilute Acid Solutions

All dilute acid solutions are to be made from relevant reagent grade concentrated acids, similar to those in Table App. 3.1. When the strengths/concentrations of these acids differ from those

Table App. 3.1. Some summary details on reagent grade concentrated acids.

Acid	≈Molarity	≈Normality	mL conc. acid/1.0 L for:		Notes
			1.0 M	1.0 N	
Acetic acid (CH ₃ COOH), 99.5%; sg. ≈1.05	17.4	17.4	57.5	57.5	Also called ethanoic acid. This weak acid is hygroscopic.
Hydrochloric acid (HCl), 36%; sg. ≈1.18	10.2	10.2	98.0	98.0	Also called muriatic acid. It is a strong mineral acid.
Hydrofluoric acid (HF), 40%; sg. ≈1.13	22.6	22.6	44.2	44.2	Extremely corrosive and dangerous to handle but is technically a weak acid.
Nitric acid (HNO ₃), 70%; sg. ≈1.42	15.8	15.8	63.3	63.3	Also called aqua fortis or spirit of nitre. It is a highly corrosive and toxic strong acid, marketed at different concentrations.
Nitric acid (HNO ₃), 882 g/L	14	14	71.4	71.4	
Perchloric acid (HClO ₄), 60%; sg. 1.54	9.2	9.2	108.7	108.7	A strong oxo-acid of Cl, comparable in strength to HNO ₃ and H ₂ SO ₄ .
Orthophosphoric acid (H ₃ PO ₄), 85%; sg. ≈1.7	15.2	45.6	65.8	21.9	A weakly dissociated acid, also called phosphoric acid.
Sulfuric acid (H ₂ SO ₄), 98%; sg. ≈1.84	18.4	36.8	54.3	27.2	A strong mineral acid (the 98% grade is quite stable in storage). It is highly exothermic: if water is added it can boil and spit dangerously.