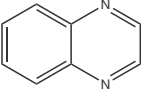
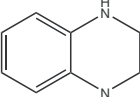
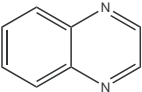
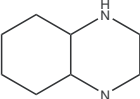


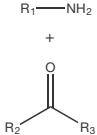

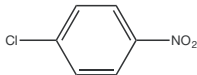
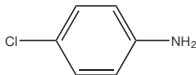
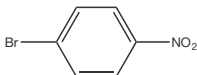
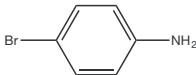
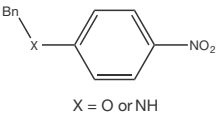
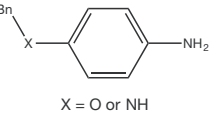
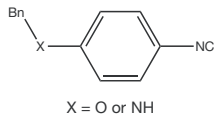
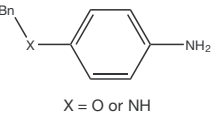
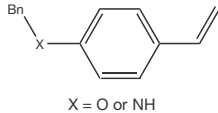
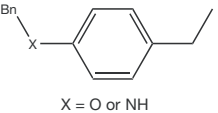
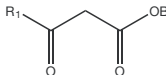
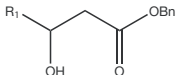
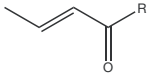
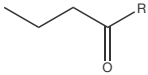



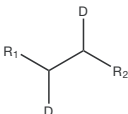


This Quick Start Reaction Guide is designed to give an H-Cube Pro™ user the best starting conditions for a particular functional group reduction. The conditions described should give 100% conversion to product in one flow through the system. All reactions should be run at a 0.05 M concentration and 100% H₂ production unless otherwise stated. This sheet will help cut down on your reaction optimization time. Please take into account that every molecule is different and in some cases a small amount of optimization may be necessary.



| Reaction Type | Substrate | Product | Recommended Catalyst | Recommended Starting Reaction Conditions |
|----------------------------|-----------|---------|--|---|
| Nitro reduction | | | 10% Pd/C or Raney Ni | 1.0 mL/min, atm. pressure, RT to 40 °C |
| Double bond reduction | | | 10% Pd/C or Raney Ni | 1.0 mL/min, atm. pressure, RT |
| | | | 10% Pd/C or Raney Ni | 1.0 mL/min, 60 bar, 60 °C |
| Full triple bond reduction | | | 10% Pd/C or Raney Ni | 1.0 mL/min, atm. pressure, RT |
| Z-hydrogenolysis | | | 20% Pd(OH) ₂ /C or 10% Pd/C | 1.0 mL/min, atm. pressure, 50 °C |
| O-deprotection | | | 20% Pd(OH) ₂ /C or 10% Pd/C | 1.0 mL/min, atm. pressure, 60 °C |
| Amine deprotection | | | 20% Pd(OH) ₂ /C or 10% Pd/C | 1.0 mL/min, atm. pressure, 70 °C |
| | | | 20% Pd(OH) ₂ /C or 10% Pd/C and acetic acid | 1.0 mL/min, 80 bar, 80 °C, acetic acid |
| Nitrile reduction | | | 10% Pd/C or Raney Ni | 1.0 mL/min, 50 bar, 70 °C |
| Oxime reduction | | | Raney Ni | 1.0 mL/min, 60 bar, 80 °C |
| Aldehyde reduction | | | 10% Pt/C or Raney Ni | 1.0 mL/min, 50 bar, 50 °C |
| Imine reduction | | | 10% Pd/C or Raney Ni | 1.0 - 2.0 mL/min, atm. pressure, 40 °C |

| Reaction Type | Substrate | Product | Recommended Catalyst | Recommended Starting Reaction Conditions |
|--|---|---|----------------------------|---|
| Selective ring saturation |  |  | 10% Pd/C | 1.0 mL/min, 20 bar, 25 °C, 7% H ₂ production |
| Aromatic ring saturation |  |  | 20% Pd(OH) ₂ /C | 1.0 mL/min, 80 bar, 100 °C |
| |  |  | 5% Rh/C | 1.0 mL/min, 80 bar, 100 °C, acetic acid |
| Reductive amination |  |  | Raney Ni or 10% Pd/C | 1.0 mL/min, atm. pressure, 40 °C Use dry solvents. Acetic acid can be used to catalyze reactions with ketones (Never use acetic acid with Raney Ni!) |
| Selective nitro reduction in the presence of a halogen |  |  | 5% Ru/C | 1.0 mL/min, 70 bar, 75 °C, 7% H ₂ production |
| |  |  | RuO ₂ | 2.0 mL/min, 70 bar, 30 °C, 7% H ₂ production |
| Selective reduction in the presence of a benzyl protected oxygen or nitrogen |  |  | Raney Ni | 1.0 mL/min, atm. pressure, 40 °C |
| |  |  | Raney Ni | 1.0 mL/min, 50 bar, 70 °C |
| |  |  | Raney Ni | 1.0 mL/min, atm. pressure, RT |
| |  |  | 10% Pt/C | 1.0 mL/min, atm. pressure, 30 °C |
| Selective double bond reduction in the presence of aldehyde or ketone group |  |  | 1% Ir/C | 1.0 mL/min, atm. pressure, RT, 7% H ₂ production |
| Reductive dethiation |  |  | Raney Ni | 1.0 mL/min, atm. pressure, 40 °C |
| Deuteration |  |  | 10% Pd/C | Use D ₂ O in water reservoir 1.0 mL/min, atm. pressure, 30 °C Only use dry aprotic solvents Do not use H ₂ saturated catalysts |