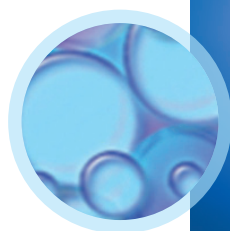



**H-CUBE**  
MINI PLUS

# – Application Overview

In-situ  
hydrogen  
production



Sealed  
catalyst  
column



## TECHNICAL PARAMETERS

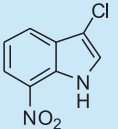
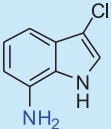
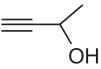
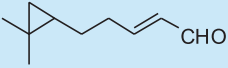
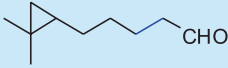
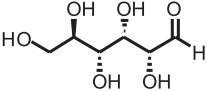
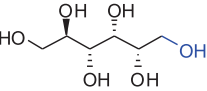
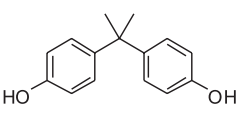
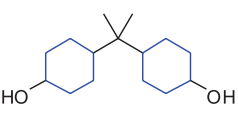
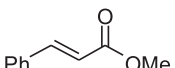
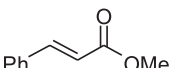
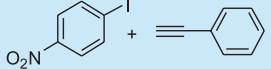
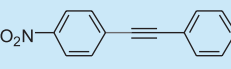
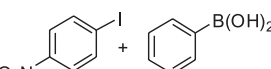
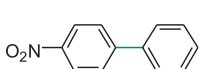
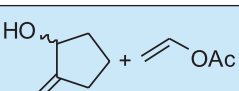
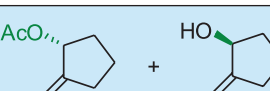
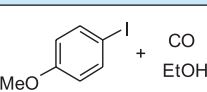
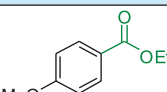
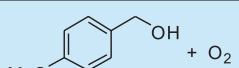
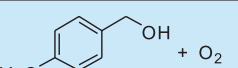
|                     |                          |
|---------------------|--------------------------|
| Temperature range   | Ambient to 100 °C        |
| Pressure range      | Atm to 100 bar           |
| Modes               | No Gas and Full Hydrogen |
| Hydrogen Generation | 20–25 mL/min             |
| Catalyst Amount     | 0.1–0.3 g                |

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| Reaction type                                                                    | Starting material                                                                   | Product                                                                              | Conditions*     | Catalyst type                                                            |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------|
| Triple bond full reduction                                                       | $R_1-C\equiv C-R_2$                                                                 | $R_1-CH_2-CH_2-R_2$                                                                  | 30 bar, RT      | Raney Nickel<br>10% Pd/C                                                 |
| O-debenzylation                                                                  | $R-O-CH_2-Ph$                                                                       | $R-OH$                                                                               | 10 bar, 60 °C   | 10% Pd/C<br>20% Pd(OH) <sub>2</sub>                                      |
| Nitrile reduction                                                                | $R-C\equiv N$                                                                       | $R-CH_2-NH_2$                                                                        | 50 bar, 60 °C   | Raney Nickel<br>10% Pd/C                                                 |
| Selective nitro reduction                                                        |    |     | 70 bar, 25 °C   | 5% Ru/C<br>RuO <sub>2</sub>                                              |
| Selective triple to double bond reduction                                        |    |     | 10 bar, RT      | Lindar catalyst<br>(Pd catalyst on CaCO <sub>3</sub> , poisoned with Pb) |
| Selective double bond reduction                                                  |    |     | 1 bar, RT       | 1% Ir/C 5%<br>Pt/CaCO <sub>3</sub>                                       |
| Aldose reduction                                                                 |   |    | 90 bar, 100 °C  | Raney Ni                                                                 |
| Aromatic heterocycle reduction                                                   |  |   | 70 bar, 70 °C   | 10% Pd/C<br>Raney Ni                                                     |
| Aromatic ring reduction                                                          |  |  | 25 bar, 50 °C   | 5% Rh/C<br>Ru black                                                      |
| <b>Other heterogeneous catalytic reactions:</b>                                  |                                                                                     |                                                                                      |                 |                                                                          |
| Deuteration<br>(fill the tank with D <sub>2</sub> O instead of H <sub>2</sub> O) |  |   | 1 bar, RT       | Pd/C catalyst<br>(Use non-H <sub>2</sub> -saturated catalyst!)           |
| Sonogashira coupling                                                             |  |   | 100 bar, 100 °C | FibreCat<br>1000-series                                                  |
| Suzuki coupling                                                                  |  |   | 20 bar, 100 °C  | FibreCat<br>1000-series                                                  |
| Kinetic resolution                                                               |  |  | 1 bar, 40 °C    | Immobilized lipase<br>enzyme                                             |
| Carbonilation<br>(in combination with Gas Module)                                |  |   | 30 bar, 100 °C  | FibreCat<br>1000-series                                                  |
| Oxidation<br>(in combination with Gas Module)                                    |  |  | 30 bar, 100 °C  | 1% Au/TiO <sub>2</sub>                                                   |

\*Please note, that the actual optimal conditions strongly depend on the flow rate and concentration as well as the present starting material.