CoRe Pro B.V.

Lab- & pilot-scale equipment

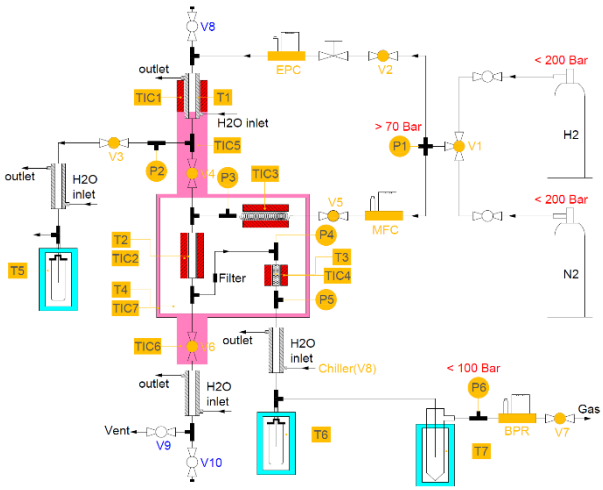
Catalytic (hydro-)Pyrolysis Unit (CPU)

This patented unit offers a solution for pyrolysis of solid and liquid renewable feedstock (either waste or model compound) using a heterogeneous catalyst *via* an *in-situ* or *ex-situ* approach under N_2 at an atmospheric pressure (catalytic pyrolysis) or under H_2 at a high pressure (catalytic hydro-pyrolysis).

Introduction

Catalytic upcycling circular carbon such as lignocellulosic biomass or plastics, contributes to a circular (bio-)economy. R&D is often performed in a lab- & pilot-scale unit, requiring:

- A universal feeding of solids and liquids (preferably in a continuous manner);
- Collection of all the gaseous, liquid, and solid products for mass/carbon balance and offline qualification/quantification;
- 'Catalytic reaction - catalyst regeneration' cycles for catalyst life-time and regenerability;
- An operation at high temperatures and pressures.



A schematic diagram of CoRe Pro - CPU.

Functionality

A standard catalytic (hydro-)pyrolysis unit (CPU) includes:

- Two pneumatic locking systems, which separate the pretreatment reactor, pyrolysis reactor, and solid residue collection;
- An *ex-situ* catalytic upgrading system;
- A 3-stage condensation system, which condenses and separates gaseous and liquid products;
- A front and back pressure controlling system, which maintains the pressure.

Control

- An integrated controlling system including a programmable logic controller (PLC) and a human-machine interface (HMI) enables an automatic operation with good reliability and repeatability;
- A unique transport of the solid feedstock and separation of the solid residue enables semi- or continuous operation;
- The pneumatic switching systems enable rapid and timely processing and product collection.

Contact us for the following product sheets:

- Continuous (co-)FCC
- Continuous (co-)hydrotreating
- Continuous catalytic (hydro-)pyrolysis
- Continuous catalytic dehydrogenation
- Continuous catalytic wet air oxidation

CoRe Pro B.V.

We co-process circular carbon.

info@corepro.eu

www.corepro.eu

Osloweg 4-17, 9723 BL Groningen

The Netherlands

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Catalytic (hydro-)Pyrolysis Unit (CPU)

Specification of a standard CPU*	
Feedstock	Solid (10 - 50 g/h, (semi-)continuous) Liquid (10 - 100 g/h, continuous)
Gas	N_2 or H_2 (20 - 100 ml/h)
Catalyst	Solid (particle size of 300 - 1000 µm, 5 - 20 g)
Pretreatment reactor	25 - 250 °C
Pyrolysis reactor	400 - 600 °C
Catalysis reactor	400 - 600 °C
Reaction pressure	1 - 60 bar
Condensation	3-Stage condensation (from -40 °C to 5 °C)

* A customized CPU can be designed and offered upon request.

Options

- A solution for the integration of a customized CPU to your existing catalytic conversion system can be offered. This provides an additional feed line for the co-conversion of circular carbon to circular products;
- A solution for the integration of an *in-situ* or operando analysis system to a standard and customized CPU can be offered.
- Various circular carbon such as waste plastics, sludge, sawdust, and non-edible vegetable oil, and the pyrolysis protocols can be offered to catalyst players for testing the refinery catalyst for the (co-)conversion of circular carbon;
- Various state-of-the-art refinery catalysts such as zeolite and E-cat, and the modified catalysts can be offered to bio-refinery for testing the circular carbon for the (co-)production of circular (bio-)based fuels and chemicals.

Gas preheater.

PLC and HMI.

High pressure for hydro-pyrolysis.

Catalytic upgrading.

3-Stage condensation.

Pneumatic locking.

Liquid sample.

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