
DOWNFLOW TECHNOLOGY FOR REFINERIES



THE HIGH THROUGHPUT
EXPERIMENTATION
COMPANY

Test catalysts and feeds for Fluid Catalytic Cracking (FCC) under relevant process conditions but with laboratory scale budgets



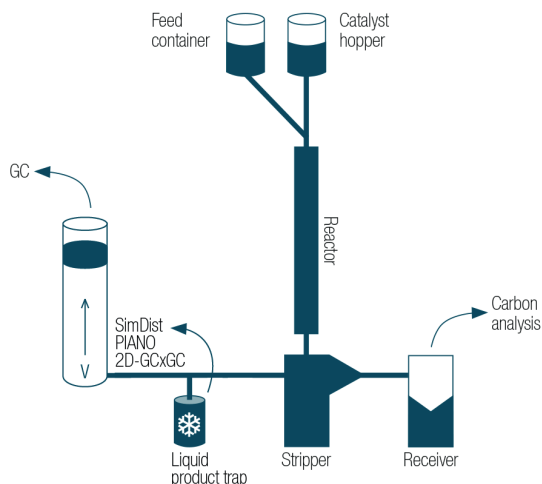
hte's downflow technology

- offers an entrained flow concept analogous to the commercial process.
- allows experiments at catalyst reactor residence times / contact times comparable to riser reactors.
- adjusts the same pressures as employed in commercial FCCUs.
- is capable of processing high severity protocols (high cat-to-oil ratio).
- covers size and operating expenditures in the range of laboratory methods.

YOUR BENEFITS

- Since catalyst and feed move in the direction of gravity back-mixing is low
- Entrained flow reactor as commercial FCCU
- Pressures typical for an FCCU or a riser can be adjusted
- Cost-efficient (operation, catalyst, feedstock)
- Fully automated lab system
- 5 crackings per 8 hour shift w/ optional increase to 18 crackings per day
- Mass balances 98 +/- 2%
- Reproducible results matching well with circulating riser units
- Flexible and broad parameter range
- Variety of feedstocks possible: VGO, high resid VGO, light cut naphtha, pyrolysis oils, biogenic feeds and full crude oil
- Feedstocks with CRC's 0-10 % can be processed

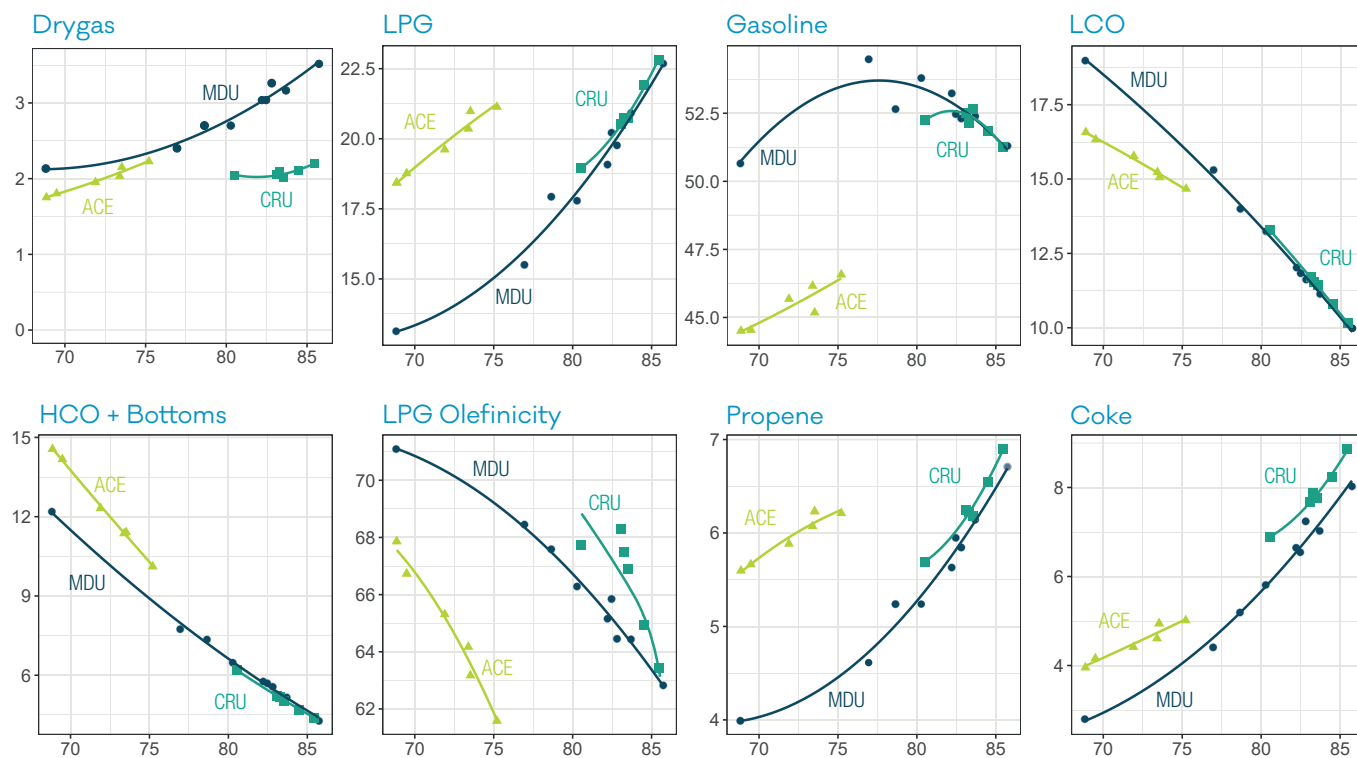
REACTOR SET-UP



TYPICAL PROCESS PARAMETERS

Operating pressure	0.2 - 3.5 barg
Reactor temperature	up to 700° C
Catalyst inlet temperature	up to 750 °C
Oil pre-heat	up to 250 °C
Oil feed rate	3 - 12 g/min
Cat-to-oil ratio	3 - 50
Experiment duration	1 min (can be adjusted)

COMPARISON OF YIELDS VS. CONVERSION FOR ACE-CRU-MDU



ACE - Advanced Cracking Evaluation

CRU - Pilot Circulating Riser Unit

MDU - Micro Downflow Unit

INFRASTRUCTURE REQUIREMENTS

Laboratory:

- Typical footprint: 1.5m x 3.5m x 1.2m (WxHxD) plus room for GC and PC workplace (height depending on the length of the reactor)
- Only local fume hood exhaust necessary

Gas Supply:

- N₂: 10 barg/100 barg
- Synthetic air: 10 barg
- House air: 10 barg
- GC gases: H₂, He, N₂, Ar

Power Supply:

- 400 VAC/5kW, other voltages upon request

APPEARANCE AND FOOTPRINT OF THE DOWNFLOW UNIT DELIVERED MAY DIFFER FROM THE UNIT DISPLAYED.