

How to Specify a BenchCAT

BenchCAT-X000-Y-A-B-C-D-E-F-G

X	Number of parallel	
	Parameter	Code
	1	1
	2	2
	4	4
	8	8
	12	12
	16	16

Y	Bed Type	
	Parameter	Code
	Fixed-bed	F
	Fluidized-bed	P
	Kettle Reactor	C

Note:

1 Must use Quartz reactor

2 Requires Stainless Steel or Incoloy HT 800 reactor

3 Must use Incoloy 800HT reactor

A	Number of Gases	
	Parameter	Code
	0	G0
	1	G1
	2	G2
	3	G3
	4	G4
	5	G5
	6	G6
	More...	

B	Number of Liquids	
	Parameter	Code
	0	L0
	1	L1
	2	L2
	3	L3
	More...	...

C	Press(bar)/Temp(°C)	
	Parameter	Code
	Atm/1200 ¹	0000
	30/650 ²	0030
	100/650 ²	0100
	100/800 ³	1008
	200/650 ²	0200
	300/650 ²	0300

D	Filling Volume (ml)	
	Parameter	Code
	< 1ml	M
	5-10ml	S
	100-200ml	L
	> 1L	K
	More...	

E	Reactor Material	
	Parameter	Code
	Quartz	Q
	Stainless Steel	S
	Incoloy 800HT	I

F	Gas/Liquid Separator	
	Parameter	Code
	YES	1
	NO	0

G	Others Option	
	Parameter	Code
	Mass spectrometer	00
	Unheated, after pressure reduction	01
	Heated, before G/L separator	02
	Wet Gas Flowmeter	03
	Electronic Balance	04
	Liquid chromatograph	05
	More...	...

Who We Are

Founded in 1984, Altamira Instruments is a manufacturer and supplier of chemisorption and physisorption instrumentation as well as bench-scale micro-reactor systems for industrial and research use.

AMI instruments have been installed at more than 300 locations around the world. Among these installations are leading national laboratories, influential academic catalyst research groups and major chemical research centers. Altamira Instruments is a company started by and is still staffed by catalysis people. We take pride in our ability to support the end-user with applications/methods development.

What We Do

Altamira offers a variety of custom designed and fully automated chemisorption and physisorption analyzers and reactor systems. From instruments that conduct temperature-programmed characterization (TPR/TPO/T-PD) to micro-reactors designed for a specific chemical process to surface area analyzers, Altamira can provide the instrument solution to your laboratory needs.

Micro-Reactor Systems



BenchCAT
Series

ALTAMIRA INSTRUMENTS

Address: Cumming, GA 30028, USA

Email: support@altamirainstruments.com

Website: www.altamirainstruments.com





Catalyst Evaluation

Performing dynamic temperature-programmed catalyst characterization experiments unattended.



One Stop Services

Designed for complex experimental applications and provides one-stop services for your laboratory needs.



Mobile Monitoring

Build an intelligent management platform using Internet of Things technology to realize remote management of equipment status and alarm push



Building Block Design

Adopt modular integrated design scheme, suitable for exploration of reaction conditions and optimization of process conditions



Desk-Top

Compact architecture design, can be placed on the desktop of the experimental platform, and has the smallest dead volume of the system.



Security Protection

Including over-pressure and over-temperature alarm, misoperation protection, power failure and gas stop treatment, etc

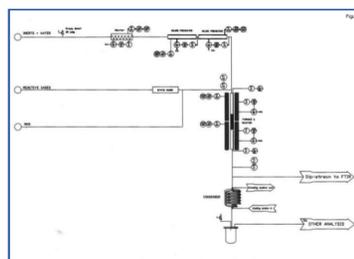
Application Case



ENGINE EXHAUST TEST

The type of equipment needed to characterize and evaluate catalytic converters requires the utilization of an actual catalyst sample (i.e., not a crushed sample) and the simulation of actual conditions occurring in the exhaust gases. Some of these conditions are:

- Very high flow rates.
 - Rapid temperature changes in the orders of hundreds of degrees during operation.
 - Complex mixtures of varying compositions, including hydrocarbon fuel, unspent hydrocarbons, NOx, carbon oxides, etc.
 - Rapidly varying changes in gas composition, from a very "rich" fuel mixture to a very "lean" fuel mixture in only fractions of a second.
- In addition, testing for diesel exhaust may also include:
- Particulate (soot) production and burn-off.
 - Simulation of Selective Catalytic Reduction (SCR).



Altamira Instruments has extensive experience in the design, construction, and commissioning of both characterization units and BenchCAT reactor units that meet all these requirements.



Ethylbenzene Dehydrogenation BenchCAT 8000 HTS

This unit consists of a single feed module split to eight parallel reactors. The feed module can deliver three gases and two liquids. Each of the liquids is pumped by a magnetic-drive mini-pump to a liquid mass flow controller. The liquids are mixed and then routed to a vaporizer-mixer capable of heating to 600oC. The gases are introduced after the vaporizer-mixer. The feed is then evenly split to the eight reactor tubes using a set of matched capillaries. A single closure is required to seal all eight reactors. The reactor effluents are routed through heated lines to a condenser and a multiposition selector valve. Analysis of the products is accomplished by gas chromatography. The unit was designed to hold up to 10 mL of catalyst in each reactor and operate at 650°C and 800 psig.

Methanol to Formaldehyde BenchCAT 4000R HP

This unit consists of 4 parallel reactors with independent gas and liquid feeds. Each reactor features four gas feeds and 1 liquid feed with vaporizer. The reactor tubes can hold up to one gram of catalyst and are stainless steel with operating temperatures and pressures spectrometer. Lexan covers are provided for added safety.



Other Applications

- Fischer-Tropsch synthesis reaction system
- Adsorption and analysis system for VOCs industrial waste gas treatment
- SDE electrolysis experiment platform system
- 2000ml trickle bed (single pass/cycle operation) experimental device system
- GC online analysis system for n-hexadecane cracking products
- Simulated extractive distillation experimental system
- Slurry bed synthesis of fluorine-containing intermediate experimental system
- Hydrogen iodide - sulfur dioxide static mixed reaction system
- Methanation micro-catalyst evaluation system
- Heat transfer oil heating catalyst evaluation system
- Ethylene glycol aqueous solution purification experimental system
- Photocatalytic kettle type continuous feeding and discharging experimental system
- Fixed fluidized bed carrying coating experiment system
- Alkylbenzene Pressurized Fixed Bed Evaluation System



Biofuels BenchCAT 1000

Biofuels have multiple sources, such as municipal waste, wood chips, soybeans, or algae. Depending on the source, a different process and thus different reactor design and conditions are used. We look here at three processes for the production of biofuels in which Altamira Instruments has participated with a BenchCAT reactor design and construction.

1. Via Gasification of Biomass
Biomass → Gasification → Syngas → Fischer-Tropsch process → Fuel
2. From Alcohols
Starch-containing material → Alcohols → Condensation Fuel
3. Via Trans-Esterification
Bio-oil → Catalytic or Supercritical Reaction with Methanol → Fuel

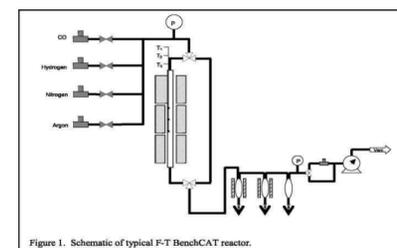
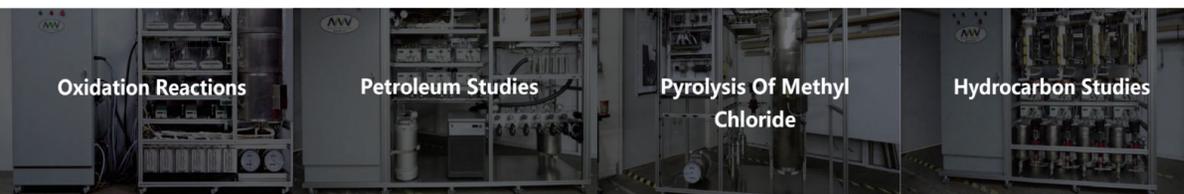


Figure 1. Schematic of typical F-T BenchCAT reactor.



Altamira

- Altamira will customize these instruments to meet your exact research needs today.
- Altamira will customize these instruments in the future to meet your changing research needs.

CONTACT US

support@altamirainstruments.com