

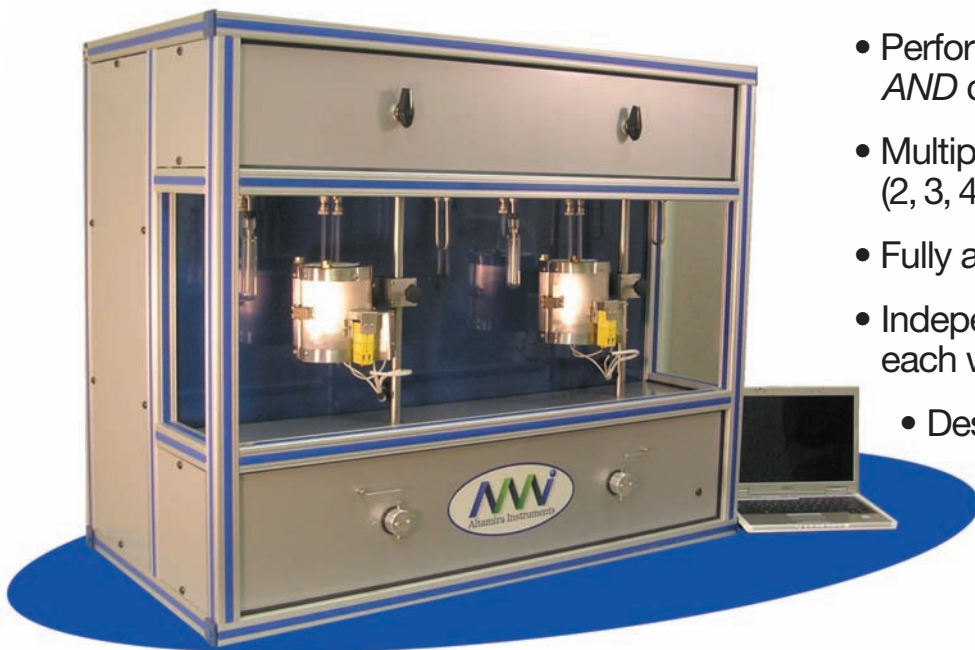


ALTAMIRA INSTRUMENTS

*The First Name in Custom Reactor Systems*

# BenchCAT™ X000R HP Hybrid

## A CUSTOM CATALYST TESTING INSTRUMENT



- Performs both reaction testing *AND* catalyst characterization
- Multiple workstations (2, 3, 4, 5, 6, or 8 workstations)
- Fully automated workstations
- Independent experiments on each workstation
- Designed for unattended operation

### *Reaction Testing:*

- Temperature Programmed Reactions
- Isothermal reaction studies
- Pressures from Ambient up to 50 bar
- Furnace temperatures up to 1200°C
- Analysis via auxiliary MS or GC
- Quartz, 316 SS, or custom reactor tube
- Sample holder sizes to 25 mL

### *Catalyst Characterization:*

- TPR, TPO, TPD, TPRx, Pulse Chemisorption
- Dynamic BET
- Furnace temperatures up to 1200°C
- Ambient pressure operation
- Subambient testing to -100°C
- Analysis via integral TCD or auxiliary MS (or GC)
- Quartz sample holder (to 1 gram)
- Monolith holder available (1"Ø x 2" long)

### **The Altamira Advantage:**

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

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# Technical Specification–BenchCAT™ 4000R HP Hybrid

## System Capabilities:

**Catalyst Characterization and Reaction Testing:** The BenchCAT 4000R HP Hybrid is a four station automated reactor system designed to:

1. Conduct temperature-programmed or isothermal experiments with catalysts loaded in a straight tube reactor at ambient or pressure conditions. External analysis will be performed with a mass spectrometer.
2. Perform Characterization experiments (TPR, TPO, TPD, Pulse Chemisorption) using catalysts at ambient pressures. Analysis will be made internally, using the TCD, or externally with a mass spectrometer.
3. The instrument is configured to perform either reaction experiments or characterization experiments on an automated basis. Reaction and characterization will always be performed as separate experiments.

## Basic System Specifications

### A. Reaction Testing

Number of Stations	4
System Operating Pressure	Ambient – 20 barg
MFC Inlet Pressure	350psig (Varies according to operating pressure)
Maximum Furnace Operating Temperature	700°C
Maximum Post Reactor Line Temperature	150°C
Number of MFCs (Reaction Side)	3 (per station)
Number of MFCs (Shared)	3 (per station, blended)
Number of Vaporized Liquid Feeds	1 (HPLC pump per station)
Materials of Construction	
• Upstream Plumbing	316SS
• Downstream Plumbing	316SS
• Sample tubes	Glass lined stainless steel
• Sample tube option	316 SS monolith holder
• Wetted Parts	316SS
• Seal Materials	Premium
• Catalyst Charge	To 1 gram
Overall System Footprint	70" x 60" x 30" (H x L x W, approximate)
Utility Requirements:	
• Oil-free, Dry Air	Multiple 80 psig utility connections
• System power	208 VAC, 90A (estimated)
• Computer power	110V/15A

### B. Catalyst Characterization

Number of Stations	4
System Operating Pressure	Ambient
Gas Inlet Pressure Range	50 psig
Gas Outlet Pressure Range	near ambient
Maximum Furnace Operating Temperature	1200°C
Maximum TCD Operating Temperature	200°C
Materials of Construction	
• Plumbing	316SS
• Sample U-tubes	Quartz
• Wetted Parts	316SS
• Seal Materials	Premium seals
• Catalyst Charge	0.1 – 1 g
Number of Treatment/Carrier Ports	4 (per station)
Number of Blend Ports	2 (per station)

