ACCENDO CORPORATION INFORMATION SHEET

Propel™
Segmented Flow Reactor System

Broaden Your Chemistry

- Accelerate your chemistry
- Extreme Reaction Conditions
  - Super-heated Temperatures: -20 to 300 °C
  - High Pressures: 150 Bar
- Microwave type reactions but at high pressure
- Immobilize metal catalyst reactors
  - Palladium
  - Copper

Green Chemistries

- Explore Green solvents at +200 °C:
  - Methanol
  - Ethanol
  - Propanol

Automate More Conditions

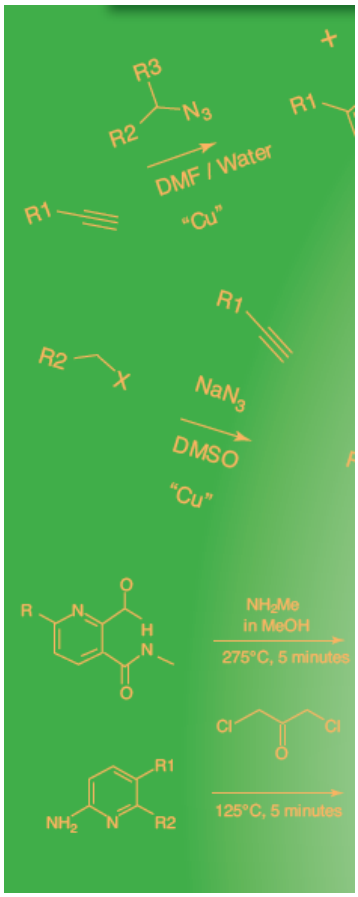
- Automate reaction preparation and injections
- Automate scale up: milligram to 100s of grams
- Automated online LC/MS Analysis and Prep LC/MS

Exploit the Benefits of Flow Chemistry

Have you been investigating flow chemistry? But have found commercial flow reactors do not enable better chemistry?

With the Propel Segmented Flow Reactor System exploiting the power of flow chemistry into your laboratory is a real solution.

It's Accendo's adoption of SEGMENTED flow that makes the difference.



Reliability

- Propel is inert to most all aggressive reagents:
  - H_2SO_4
  - HCl
  - Bromine
  - LiHMDS
  - BuLi
- Larger flow channels—dramatically reducing clogging

Flexibility

- Higher pressures—enabling high temperatures (300 °C)
- Milligram to 100s of grams—minimizing substrate or produce starting materials

Productivity—Automation

- Segment scheduling
- Segment preparation and injection
- Collection
- Sampling
- Integrated LC/MS dilution, injection, analysis and reporting
- Integrated Prep LC/MS injection

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What is the Propel?

The Propel system consists of modular hardware and software that when integrated together creates a sophisticated segmented flow reactor solution for organic chemistry.

By adopting segmented flow technology the Propel enables the pursuit of chemical reactions not easily pursued with typical traditional laboratory equipment. Propel has successfully performed reactions routinely run in a microwave, duplicating the extreme temperatures but allowing high pressures enabling the use of low boiling point and greener solvents such as methanol and ethanol.

With the Propel, exploration of reaction conditions for screening and optimization of small volume reaction segments (<1 mL) enables more experiments while using less starting material.

The Propel's optional online integration LC/MS for either Analysis or Prep Mode there's no queuing up for analysis, every experiment is automatically diluted, injected, analyzed and with Propel's automatic data reporting, each segment's information is instantly made available for review.

Once optimized reactions can instantly scaled to 100s of grams using the same method as that used to make milligrams.

What is Segmented Flow?

Accendo Corporation explored continuous flow chemistry. But continuous flow had limitations. Primarily, high reagent use, low throughput, reliability due to exposure of wetted materials to aggressive chemicals and limited temperature and pressure ranges reduced the breadth of chemistries.

Therefore, Accendo adopted a segmented flow approach where individual experiments are automatically prepared using accurate syringe pump technology and automatically injected into a high pressure, continuous flowing stream of transport solvent using an HPLC injection type valve.

Once in the flow regime, segment continuity is maintained with gas or immiscible solvent spacers while transported through the reactor where incubation rate is controlled by a high pressure pump.

The independent preparation and injection of reaction segments creates a truly viable flow chemistry solution with minimum reagent use, extreme pressures and temperatures, automating sample dilution and injection into online LC/MS analysis or Prep LC/MS.

Chemistries and Versatility?

The Propel Flow Reactor System has proven to perform many types of chemistries, specifically, chemistries that are typically run in microwave reactors and forbidden chemistries such as those utilizing azides.

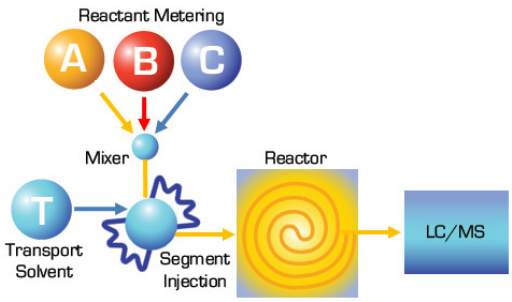
- Click Chemistry
- Aryl Subsititutions
- Diehls Alder
- Cyclizations
- Sonogashira
- Decarboxylations
- Michael Additions
- Suzuki Reactions

The Propel contains a single-stage reactor system that allows the programming and screening of up to nine different conditions: stoichiometry, temperature and incubation rate.

Once optimized, reactions can easily be scaled to 100s of grams with no method reengineering.

The Propel was designed to allow for rapid screening and scaling on the same platform.

The system is routinely used in Medicinal Chemistry for reaction screening/optimization and integrated into Process Research for the screening of more cost-effective reaction conditions and scale-up of early pre-clinical quantities.



Propel Technical Specifications

Propel Hardware	
Pump Module	
Transport Solvents	(3) Solvent Reservoirs
Flow Rate	20 to 3,400 µL per minute
Incubation Rates	1 to 100 minutes
Chemistry Module	
Reagent Diversity	(3) Reagent Reservoirs
Mixing Temperature Range	-10 to 100 °C
Segment Reagents	Up to three reagents per segment
Incubation Temperature Range	Ambient to 300 °C
Reactor Materials	Palladium Hastelloy Copper Teflon (PFA)
Analytical Interface Module	
Sample Volume	Configurable: 20 to 1,000 µL
Dilution Ratio	Neat to 250
LC/MS	Analytical or Preparative
Computer	
Operating System	Windows XP, Windows 7
Propel Software	
Propel Design and Control Wizard	Experiment design and system control application

Contact us for an onsite demonstration:

Accendo Corporation
3762 S Carson Avenue
Tucson, AZ 85730
Phone: +1.650.576.3184
Fax: +1.520.300.7000
E-mail: info@accendocorporation.com
http://www.accendocorporation.com

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