



Tomorrow's Catalysis Today



Get in touch
with us!

Avantium Chemicals BV Zekeringstraat 29, 1014 BV Amsterdam, The Netherlands +31 (0)20 586 80 80



'We offer
**innovative R&D Services
and Systems**
that help you accelerate
catalyst development and unveil
deeper insights into catalysts
properties and performance.'
Steven Olivier
Managing Director Catalysis

Avantium

Tomorrow's Catalysis Today

There is a constant requirement for better catalysts and chemical processes to meet increasingly challenging & changing economic and environmental demands. Your competition is fierce, with the greatest rewards going to those having not simply the best ideas but also the ability to turn them into reality in the shortest possible time.

Avantium provides the means to grade your new ideas quickly and to progress them through the entire R&D, deployment and commercialization cycle.

Our uniquely-designed testing services and systems make for faster results, more-efficient workflows, greater R&D productivity and earlier product launches.

We offer you the ability to generate far more knowledge than traditionally possible, leading to clearer and deeper insights into catalyst behavior and process performance.

With Avantium you benefit from accelerated catalyst R&D, which ultimately translates into greater competitiveness and profitability.



Flowrence Platform Accelerated catalyst R&D

Avantium's unique Flowrence Technology platform gives you:

- Access to outstandingly accurate and reliable data.
 - Access to skills, knowledge and experience.
 - Access to meaningful results, correlating with commercial plant scale.

Avantium helps you devise the most appropriate catalyst testing solutions in line with your specific process testing objectives. These solutions can involve novel systems and/or methodologies.



'Our deep understanding of **catalyst science and process technology** enables us to closely align with customers seeking to accelerate their R&D involving catalyst development.'



R&D Services

We have more than 700 reactors available in the Avantium laboratories in Amsterdam, including various high-throughput, multi-parallel testing platforms, both fixed-bed and batch for heterogeneous and homogenous catalyst R&D. Most of these reactors are based on our unique Flowrence Technology platform. With this in-house capacity we perform catalyst testing tailored for the various R&D stages of a catalyst in line with your objectives. Find out the different options that we offer with our R&D Services.

Obviously, catalyst and process IP stays with the customer within all R&D Service projects.

If you need more information, please contact us!

Catalyst testing projects

Customers ask us to conduct specific catalyst testing work, often part of more extensive R&D programs. This is commonly to overcome equipment/staff constraints or to solve delicate testing challenges. We take pride in our ability to deal with short lead times and turn out valuable results quickly.

Research collaborations

We are accustomed to working in integrated teams with customers to formulate experimentation strategies around R&D objectives and, ultimately, to deliver them. The collaborations benefit from having (high-throughput) catalyst testing equipment, catalyst preparation facilities, well-qualified experts and a topclass data analytical capability - all under the same roof.



Commercial evaluation – Select the best catalyst

Avantium performs third-party, independent test work in support of the catalyst procurement programs conducted by leading refineries and chemical plants. Customers do not need in-house equipment or experimental knowledge and can be confident in the accuracy and reliability of the results. The ultimate benefit comes from identifying the catalyst best suited to a particular application or process unit.

'Our high-throughput specialists have a reputation for **unconventional thinking** and boat and impressive track record of developing novel approaches to seemingly intractable R&D challenges.'

R&D Systems

Over the years Avantium's Flowrence has been recognized by R&D organizations globally as a powerful high-throughput catalyst testing system enabling accelerated screening of new catalysts and chemistries. Our Flowrence technology has been developed to be highly flexible for devising optimal testing configurations in each R&D phase - from early discovery to commercial evaluation.

All our systems generate outstandingly accurate and repeatable data for you, leading to clearer and deeper insights into catalyst behavior and process performance.

Key features of Flowrence Systems

- Robust and reliable equipment
- Easy to operate and maintain
- Reproducibility between the multiple parallel reactor streams
- Ability to test powders and extrudates
- Compact design incorporating numerous safety features
- Flexibility - having a wide operating window and the ability to study a variety of chemistries
- Excellent Customer Service
- Purpose-designed software to control experiments, data mining and visualization.

Get in contact with us to find the best solution for you.

Flowrence Technology Systems

R & D stages

Discovery

Flowrence XD

Looking for an early-stage R&D testing system? Then this unit is the perfect solution for you. You will benefit from a highly flexible and reliable unit designed for ease of use. Catalyst discovery made easy!

Research

Flowrence XR

Looking for a high-throughput testing system for catalyst research? Then this is your unit of choice. Benefit from accuracy, reproducibility, reliability, safety and customization for your needs. Accelerate your catalyst research!

Easyload



Microfluidic distribution



Liquid collection



Active pressure control



Active liquid distribution
Individual reactor
temperature control



Process

Flowrence XP

Looking for an industrially relevant kinetic model or optimal process conditions for your catalyst system? By applying a broad range of experimental conditions, such as temperature, pressure and feed composition, you will significantly de-bottleneck your bench scale/pilot plant usage.



Commercial

Flowrence XC

Looking for the best commercial catalyst for your industrial process? Then this unit facilitates your catalyst selection to achieve the best economic solution for your industrial process. Get in contact with us to find out the variety of options we offer for this stage.



 = Standard
 = Option

Customer Service

You purchased a Flowrence R&D System – a sophisticated platform performing high quality catalyst testing. We know the importance of excellent support to get the most out of your investment. Expert assistance is on hand during installation and commissioning, and we provide training and ongoing technical support under customized service-level agreements.

Call +31 20 586 01 74 or send an email to customerservice@avantium.com



'We are ready to help you
get the most out of
your Flowrence System.'



Analytics & Software

The key to utilize our Flowrence Technology platforms is the combination of online sampling with robust separation techniques and by this giving the customer precise data in the shortest amount of time. This enables us to compare your catalysts and process conditions in a multi-reactor setup.

Integrated fast gas chromatography is the primary tool to give the accuracy required without compromising on speed. We expand on this technique with sulphur specific detectors or unique mass spectroscopy identification.

Complementary to the online analytics we offer a broad range of offline analyses such as simulated distillation, density and sulphur/nitrogen analysis to deepen understanding.

Our operating software solutions give full control to the user from design of experiment to reporting, integrated in your IT environment. Catalyst sample management and barcode controlled tracking of offline analytical data complete the whole catalyst evaluation workflow. All this information comes together in our proprietary software database ready to be used in standard office tools as well as advanced data mining software.

From the vast amount of information collected during an experiment, our software solutions extract valuable knowledge to accelerate your catalyst R&D.

Get in contact with us to discuss your particular needs.

Contact

Let's find out more!
catalysis.avantium.com

Let's stay updated!
catalysis.avantium.com/news-events/

Let's get in contact with us!
Interested to learn more?
Call : +31 (0)20 586 80 80 or
Email: catalysis@avantium.com

Subscribe to our newsletter!
Twice a year we send out
The Catalysis Insider sign up at
catalysis.avantium.com/news-events/



twitter.com/avantium



[linkedin.com/company/
avantium-technologies](https://linkedin.com/company/avantium-technologies)



youtube.com/user/OneAvantium





'Avantium operates a business model designed **to create value for customers** in whichever way makes most sense to them.'

About Avantium

Avantium is a leading chemical technology company and a forerunner in renewable chemistry. Together with its partners around the world, Avantium develops efficient processes and sustainable products made from biobased materials. Avantium offers revolutionary renewable chemistry solutions from invention to commercially viable production processes. With its Catalysis Business Unit, Avantium provides catalysis research services and systems to leading chemical and petrochemical companies.

Avantium shares are listed on Euronext Amsterdam and Euronext Brussels (symbol: AVTX). Its offices and headquarters are in Amsterdam, the Netherlands. Over 140 highly skilled colleagues representing 20 nationalities, Avantium fosters a dynamic and enthusiastic workplace that is constantly seeking new ways to improve and expand the impact of advanced catalytic research & technology.