

**XPure**

**Simulated Moving Bed  
System for Chromatography  
and Ion exchange applications**

**Better solutions for  
your purification needs**



**XENDO** is a leading consultancy and project management organisation in the fields of (bio-)pharmaceutical products, medical devices and healthcare. Over 230 experienced and highly educated professionals provide strategic advice, project management and implementation, interim management, auditing, operational support and training.

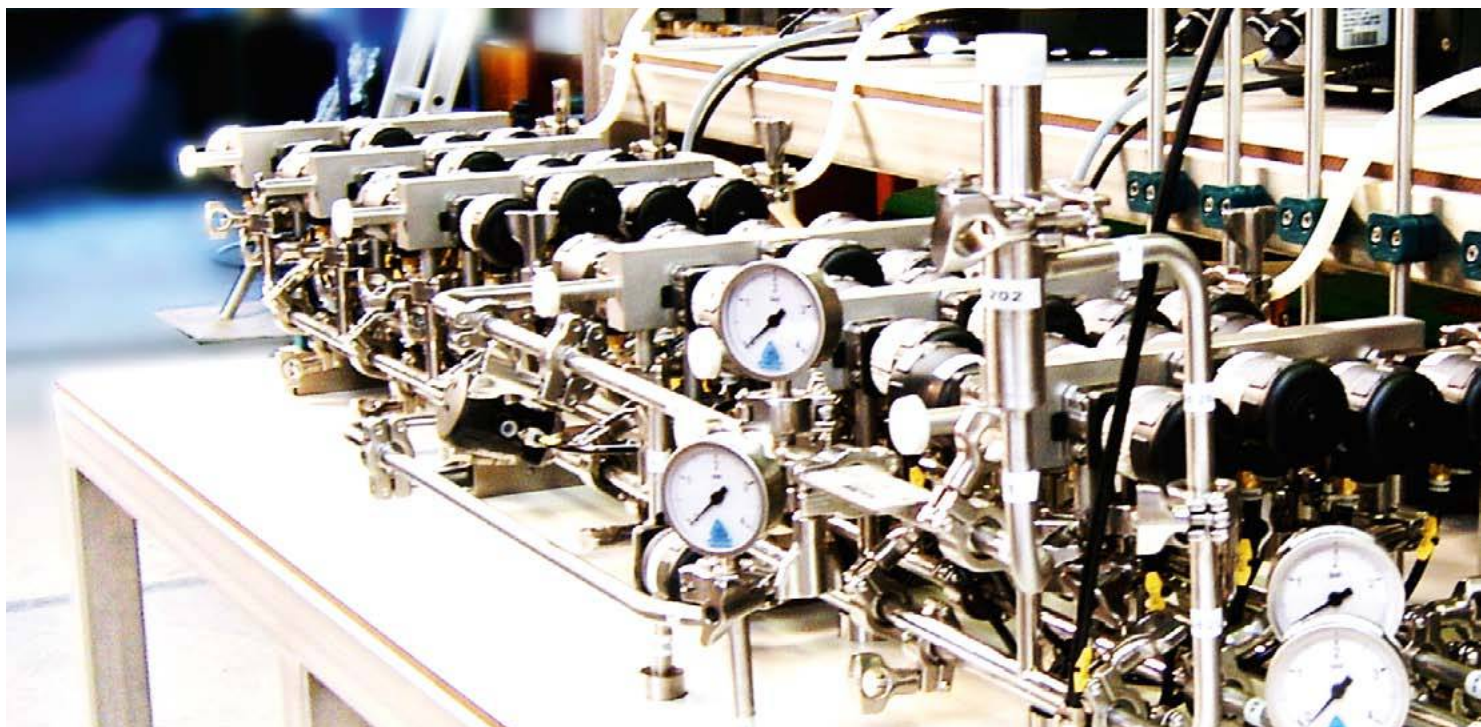
For over 25 years we have successfully completed thousands of national and international assignments for start ups as well as for the largest, established multinational companies and organisations. It is our mission to provide optimal solutions for our life science customers during the full life cycle of their products and health care solutions. We enhance processes related to quality and safety of your product and we strive to shorten the time to market.

- Product Development
  - Regulatory Affairs
  - Engineering & Facility Support
  - Quality Management & Lean Six Sigma
  - Pharmacovigilance
  - Qualification & Validation
- 



Xendo Bio Science Park





Xendo pilot static SMB **XPure-S** with zero dead leg valve modules

## XENDO ENGINEERING

Xendo's engineering and technical services support the full life cycle of process equipment and (Bio) pharmaceutical facilities. From project initiation, through design and construction, our engineers offer you a pragmatic approach to build specific process equipment and (GMP compliant) facilities.

Our Maintenance support and Asset Management services assist you in keeping your equipment and facilities fit for purpose in a cost effective way.

Depending on the needs of your project we operate from multidisciplinary teams at our Leiden office or provide you with professional support at site.

### **Xendo supports you to evaluate different techniques for:**

- Purification
- Recovery
- Isolation of products

### **Xendo SMB XPure engineering services**

- Range from lab, pilot to industrial scale SMB systems (up to 150m<sup>3</sup> resin inventory)
- Covers complete design cycle
  - characterization
  - sorbent screening
  - pilot testing (on site)
- Covers sugars, food, food and non-food ingredients, (bio)pharmaceuticals, API's and fine chemicals hydrometallurgy
- Rely on state-of-the-art (good) engineering and automation practices and are automated to a steady-state operating process producing constant high quality product streams

As SMB system supplier Xendo delivers two state-of-the-art technology concepts of SMB: **XPure-S** and **XPure-C**.

## XPURE

- The static SMB system **XPure-S** that represents the by Xendo patented valve system with a zero dead leg concept.
- The carrousel SMB system **XPure-C** featuring a turn table that carries the sorption containers going through the distinct process steps of a typical IX-chromatography cycle.

### Xendo offers SMB technology for product recovery and purification, comprising of

- Feasibility studies
- Developed simulation modelling software
- Full scale design
- Start-up, validation, maintenance and (process) service and
- Is not related to any manufacturer of resins
- Applies originally manufactured components or any fabricates that are consistent with clients material standards
- Optional elements
  - vessels and liquid distributors
  - (inter)connecting piping and auxiliary equipment

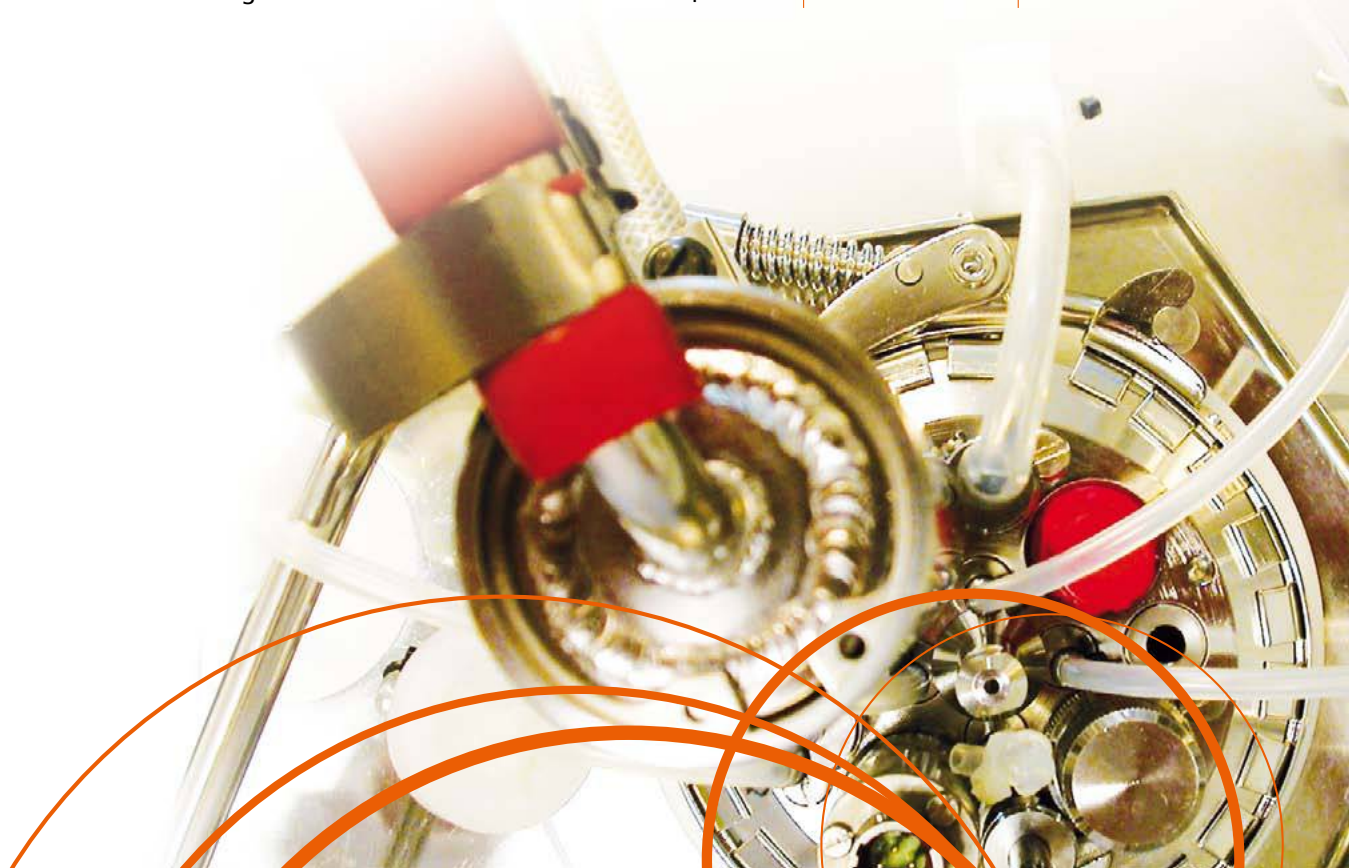
### Chromatography principles

The chromatography principles can be divided in two phenomena: elution and fractionating chromatography. The chromatographic mode to be used is based on the binding characteristics of the ingredient.

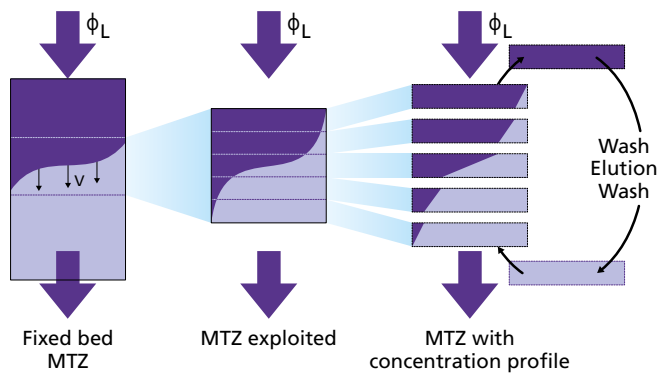


Xendo Static SMB **XPure-S** during construction work

	Fractionating	Elution
Affinity	✓	✓
Ion exchange	✓	✓
Size exclusion	✓	
Reverse phase	✓	







### Fixed bed versus SMB in Ion Exchange and Chromatography

Two basic configuration concepts, fixed bed and continuous concept:

- Stationary or **fixed bed** configuration
  - one or multiple beds
  - (redundant) parallel or serial configuration.
- **Continuous concept** where multiple beds are processed simultaneously in different process modes.

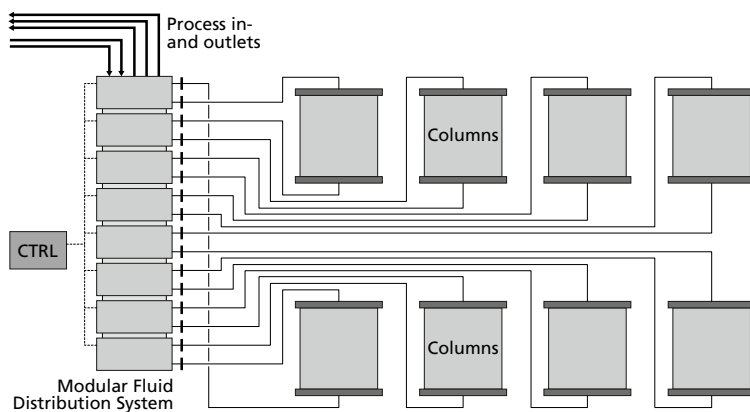
Fixed bed configuration with Mass Transfer Zone (MTZ) evolving into SMB concept

### Process comparison Fixed Bed and SMB chromatography:

Aspect	Fixed bed	Continuous
Treatment ratio	High (large BedVolume number)	Medium/low (typically <25 BV's)
Value product	Low/medium	High
Resin unit cost	Low/medium	Medium/high

### Economical comparison Fixed Bed and SMB chromatography:

Aspect	Fixed bed	SMB
Resin inventory	Large	Medium/low
Effective use of resin	Medium/low	High
Process	Batch	Continuous
Cycle time	Long	Short to medium
Redundancy	High	No
CAPEX	Low/medium	Medium/high
Resin investment	High	Substantially lower
Chemical and water consumption	High	Substantially lower



Schematic representation of an 8 column static SMB system with its valve blocks.





Columns of Xendo pilot carousel **XPure-C**

## SUMMARY

### **Xendo can cut your chromatography process costs by 20-50%**

- Less stationary phase (sorbent) media (resins) by higher utilization, that result in significantly
  - reduction in buffer consumption (countercurrent contact)
  - lower water consumption
  - less energy
- Due to the modular characteristics of the valve blocks, Xendo can assemble these in a fast and efficient way

All this makes Xendo SMB technology attractive in terms of

- Design
- Cost
- Delivery time
- Smooth (after sales) services.

### **Xendo has experience**

- Over 200 SMB studies
- Over 30 of industrial projects realised

If you are interested in any of the above services, please contact:

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