Stax™

DISPOSABLE DEPTH FILTERS, WITH SEITZ™ AKS ACTIVATED CARBON MEDIA

High efficiency in adsorption and design

Powdered activated carbon (PAC) is widely used in the pharmaceutical industry for decolorization and removal of other trace impurities. The use of bulk PAC has significant drawbacks relating to the handling of bulk carbon powder, cleaning of process equipment, and time (costs) associated with carbon removal from the process. Seitz AKS immobilized carbon media alleviates these concerns by incorporating activated carbon within a matrix of cellulosic fibers. This immobilized carbon media is then coupled with a downstream filter paper to prevent carbon particle shedding downstream of the filter. Additionally, the adsorption efficiency of Seitz AKS immobilized carbon filter media is greater than an equivalent amount of bulk PAC, further reducing overall process time and increasing product yield. (Table 1).

Table 1. Comparison of PAC and Seitz AKS immobilized activated carbon media

PAC process	AKS process	Improvements
Complex multiple steps	Streamlined single step	Faster process Better yields Reduced labor
Powder addition and mixing	Flow through single pass	Better adsorption Improved yields Faster process
Carbon powder contamination distributed throughout process plant	No upstream carbon No/trace carbon downstream of module	No cleaning Minimal downstream filtration
Dusty, difficult to handle	No dust	Improved health and safety

Seitz AKS immobilized activated carbon filter media provides a streamlined process only requiring a single step. The feed stream is simply passed once through the filter at an appropriate flow rate to achieve the desired adsorption. This saves time, resources, and expense.

Fig 1. Five-high process chassis with capsules.

Stax™ AKS systems

Combining the high efficiency Seitz AKS media grades with the Stax capsule reduces the handling of activated carbon.

The Stax system design provides simple and intuitive operation

Placed into one of the three differently sized chassis, our single-use Stax AKS capsules do not require the use of stainless steel housings which require costly cleaning and cleaning validation. Stax system chassis are designed for assembly and use by a single operator and provide a logically conceived disposable platform in which the operator can load, operate and unload in an ergonomically designed vertical (Table 2).

Flexible process design

The Stax platform has been designed to accommodate multiple processing options. Whether you want to process:

- Bottom up
- Top down
- Bottom in/bottom out
- In series

Our manifold kits provide flexibility in your process design.

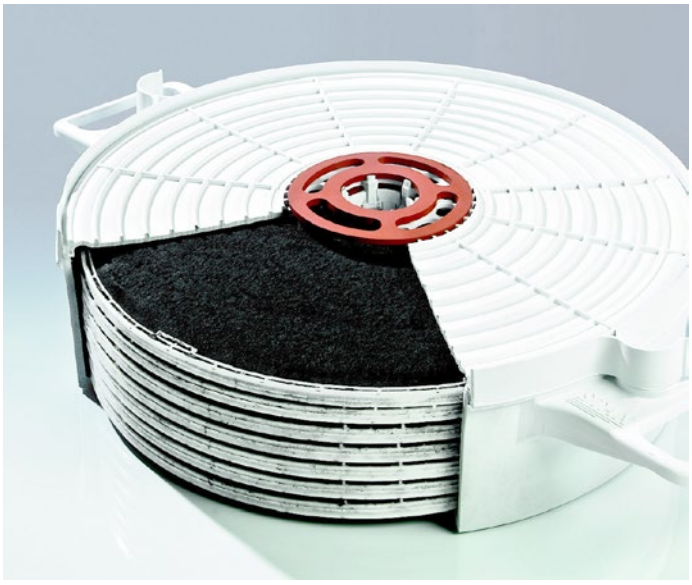

Fig 2. Inside view into a Stax capsule with an activated carbon module.

Table 2. Features and benefits of Stax AKS systems

Features	Benefits
No housing	Easier to use and manipulate while reducing operator safety issues
Disposable	No need for cleaning and cleaning validation
Small footprint	Enables use in close proximity to other equipment and reduces cost to install
Intuitive design	Reduces operator training and increases time to acceptance
Encapsulated design	Reduces operator exposure to potential biohazards
Low hold-up volume	Greater product recovery and lower post use rinse volume required than traditional modules and housings

Seitz AKS filter media

Macro- and mesopores can generally be regarded as the highways into the carbon particle, and are crucial for adsorption kinetics. Macropores are used for the transport, and adsorption occurs in the meso- and micropores. Small molecules, such as methylene blue which has a molecular weight of 319.86 Da, are mainly captured in micropores. For larger impurity molecules, other pore structures in the carbon must be available to ensure optimal adsorption. Carbon, which can capture larger molecules, tends to adsorb smaller impurities as well, whereas dedicated carbons for small molecules do not remove larger contaminants.

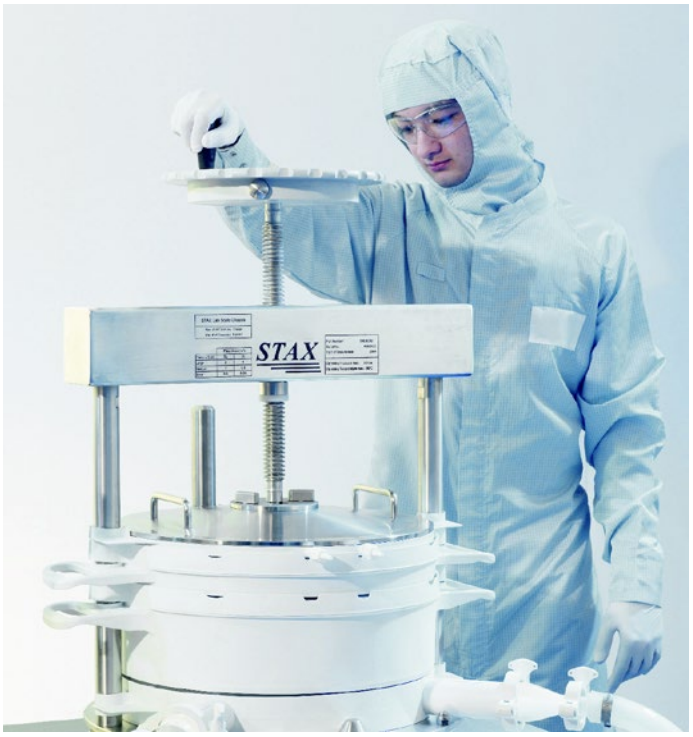

Fig 3. Pilot-scale Stax chassis with capsule and manifold installed.

Fig 4. Activated carbon modules.

Table 3 provides an overview of how different AKS grades may suit an application based on their general characteristics. However, due to the various factors that may affect the adsorption process, we recommend scaled-down testing of several grades of filter media (1).

Table 3. Typical efficiency characteristics of Seitz AKS media grades

Media grade	Efficiency characteristics	Typical molecular weight of target contaminants
AKS 1	Ultra-high efficiency	400 to 1500 Da
AKS 2	Ultra-high efficiency	400 to 1000 Da
AKS 5	High efficiency	200 to 400 Da
AKS 6	High efficiency	400 to 1500 Da
AKS 7	Ultra-high efficiency	400 to 1500 Da
AKS 8	High efficiency	400 to 1000 Da
AKS 9	High efficiency	400 to 1000 Da

Technical information

Stax AKS capsule configuration codes for different AKS media grades

Media grade	Media code	Configuration for Stax AKS capsule	Amount of PAC present / Stax capsule (kg)	Media area / Stax AKS capsule (m^2)
AKS 1	XAK1	406	1.45	1.40
AKS 2	XAK2	406	1.45	1.40
AKS 5	XAK5	407	1.05	1.62
AKS 6	XAK6	407	1.30	1.62
AKS 7	XAK7	406	1.45	1.40
AKS 8	XAK8	407	1.30	1.62
AKS 9	XAK9	407	1.30	1.62

Typical ash and endotoxin level for different AKS grades

Media grade	Typical ash content in %	Typical endotoxin level (in EU/mL)
AKS 1	< 3	< 0.12
AKS 2	< 4	< 0.12
AKS 5	< 1	< 0.06
AKS 6	< 3	< 0.06
AKS 7	< 3	< 0.12
AKS 8	< 2	< 0.12
AKS 9	< 2	< 0.12

Dimensions and weight of Stax AKS capsules

	Capsule footprint		Capsule weight	
Capsule size	**Diameter**	**Height**	**Dry**	**Wet [1]**
Large	442 mm (17.4 in.)	128.8 mm (5.1 in.)	7.0 to 7.5 kg	< 13 kg

[1] Post blow down

Materials of construction (2)

Media	Cellulose base and PAC
Capsule shell	Glass filled polypropylene
Filter element	Polypropylene
Gaskets	Silicone

Operating parameters [2]

Maximum operating temperature	60°C
Maximum operating pressure	3.5 bar (50 psi) at 25°C 1.0 bar (14.5 psi) at 60°C
Maximum differential pressure	2.5 bar (36 psi) at 25°C – forward direction

[2] Note: All pressure and temperature specifications are for Stax capsules correctly installed into Stax chassis.

Sanitization

Hot water sanitization	80°C at 1 bar (14.5 psi) for 1 h
Post use caustic treatment	1 M NaOH at 3.5 bar (50 psi) for 1 h at 25°C

Traceability

Capsule product code laser engraved with	Media batch number Internal sales order number Unique serial number

Pre-release testing

All capsules 100% leak tested.

Stax chassis information

Chassis dimensions

	Footprint size		
Chassis model	**Height**	**Length**	**Width**
SXLSC02	1018 mm (40.0 in.)	516 mm (20.3 in.)	516 mm (20.3 in.)
SXLSC02W	1059 mm (41.7 in.)	591 mm (23.2 in.)	560 mm (22.0 in.)
SXPSC05P	1241 mm (48.9 in.)	610 mm (24.0 in.)	610 mm (24.0 in.)
SXPSC05W	1312 mm (51.6 in.)	1150 mm (45.3 in.)	800 mm (31.5 in.)
SXPSC10P	1864 mm (73.4 in.)	610 mm (24.0 in.)	610 mm (24.0 in.)
SXPSC10W	1935 mm (76.2 in.)	1150 mm (45.3 in.)	800 mm (31.5 in.)

Chassis weights and capsule capacity

		Number of Stax AKS capsules	
Chassis model	**Weight**	**Minimum**	**Maximum**
SXLSC02	75 kg	1	2
SXLSC02W	75 kg	1	2
SXPSC05P	190 kg	1	5
SXPSC05W	192 kg	1	5
SXPSC10P	238 kg	1	10
SXPSC10W	240 kg	1	10

Chassis materials of construction

304/1.4301 stainless steel 1.2 µm / 64 µin. Ra (typical) electro-polish

Design basis

- Conforms to Pressure Equipment Directive - Category 1/ Module A (SXLSC02 is Sound Engineering Practice)
- Outside scope of ASME VIII Div 1 complies with Universal Building Code (1997) - Zone 4/importance factor 1.25 (SXPSC[3] P only)

[3] Place holder for either 05 (indicating a five-high process scale chassis) or 10 (indicating a 10-high process scale chassis) ATEX chassis available upon request.

Ordering information

Stax capsules with Seitz AKS media

Product	Product code
Stax capsule with AKS1 media	SXLXAK1406SP
Stax capsule with AKS2 media	SXLXAK2406SP
Stax capsule with AKS5 media	SXLXAK5407SP
Stax capsule with AKS6 media	SXLXAK6407SP
Stax capsule with AKS7 media	SXLXAK7406SP
Stax capsule with AKS8 media	SXLXAK8407SP
Stax capsule with AKS9 media	SXLXAK9407SP

Stax chassis

Product	Product code
Pilot scale without castors	SXLSC02
Pilot scale with castors	SXLSC02W
5 high process scale without castors	SXPSC05P
5 high process scale with castors	SXPSC05W
10 high process scale without castors	SXPSC10P
10 high process scale with castors	SXPSC10W

Stax manifold kits

Product	Product code
Bottom in – bottom out	SXBBM400SP
Bottom in – top out	SXTBM400SP

Fig 5. Stax manifold example.

References

1. Activated carbon filters data file and Activated carbon AKS depth filter media validation guide
2. Stax capsule system validation guide and Activation carbon AKS depth filter media validation guide

cytiva.com

For local office contact information, visit cytiva.com/contact

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