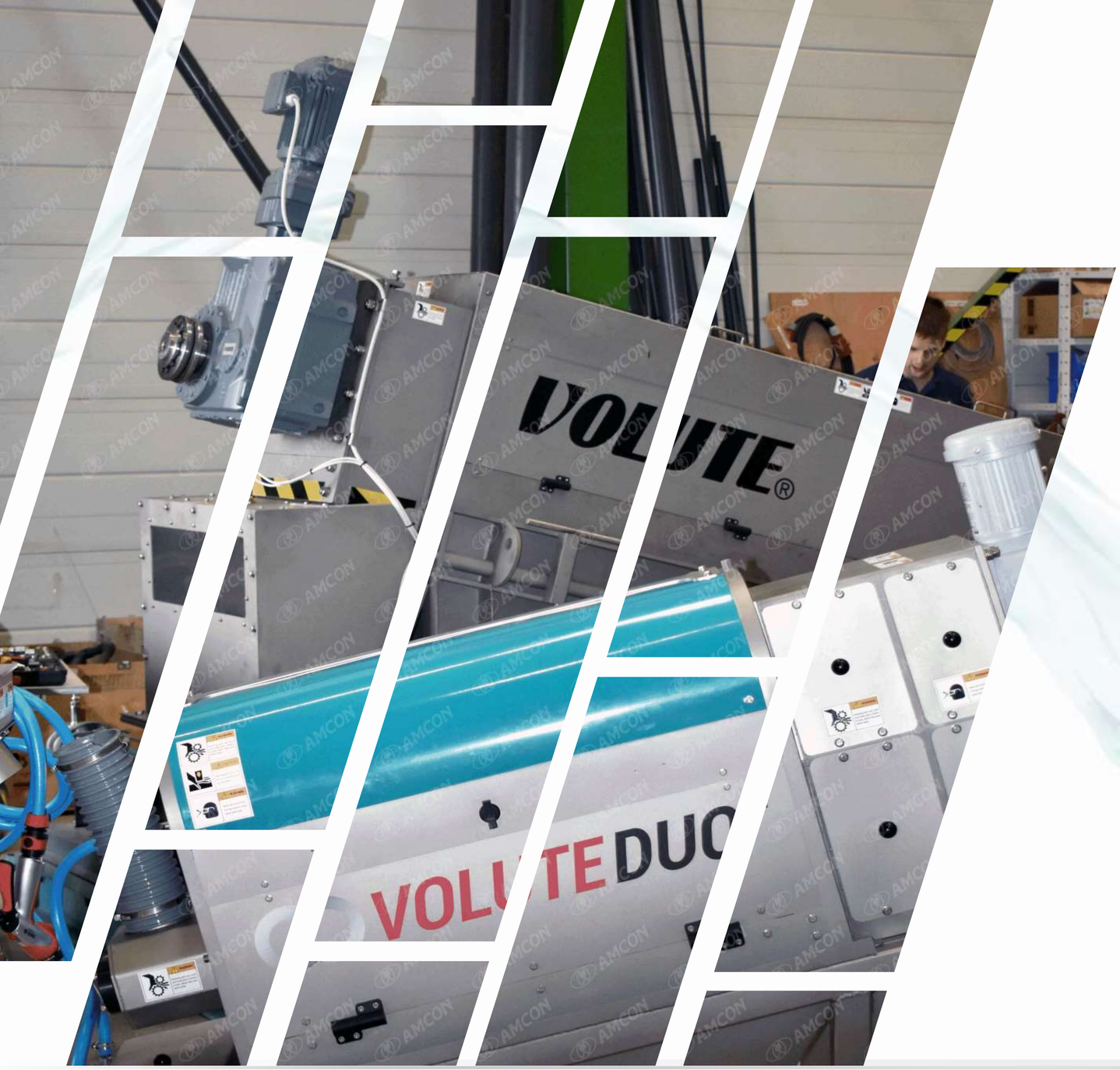


VOLUTE DUO™

From Revolution to Evolution

©AMCON Europe s.r.o. 2020

What are VOLUTE™ and VOLUTE DUO™ ?

VOLUTE Duo™ is a major evolution of VOLUTE™ Dewatering Press which AMCON invented and introduced to the world in 1991.

VOLUTE™ The first multi-disc screw press in the world, 1991.

VDS series 2012

GS series 2016

©AMCON Europe s.r.o. 2020

What are VOLUTE™ and VOLUTE DUO™ ?

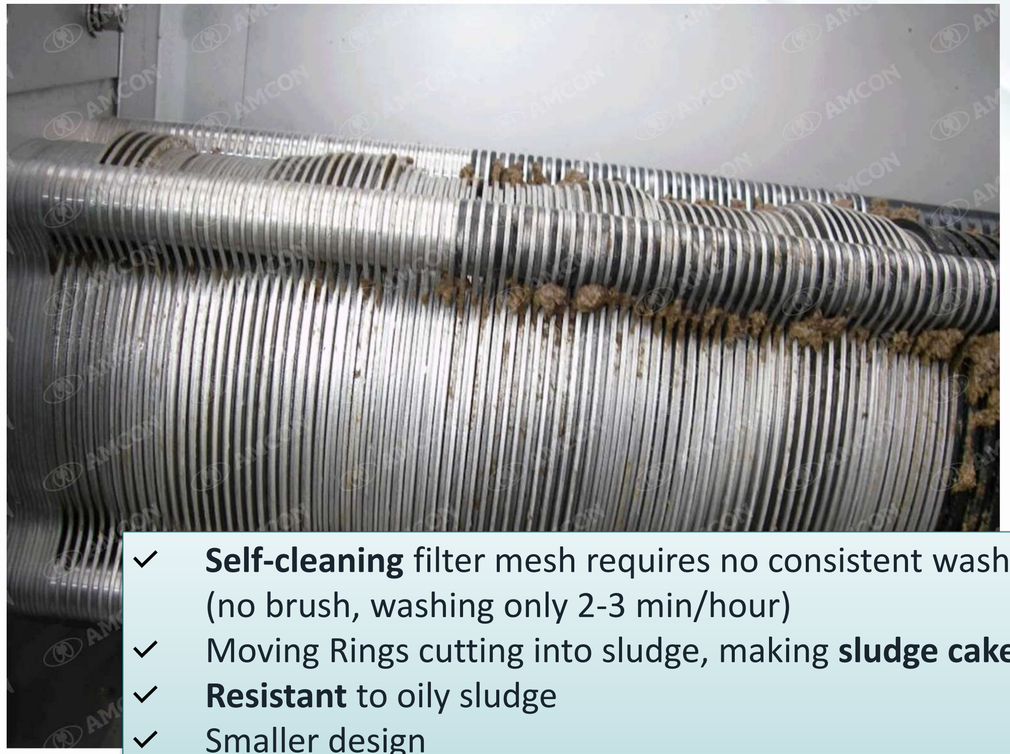
VOLUTE™ achieved **self-cleaning filtration** with its unique structure of Moving and Fixed Rings accumulated on each other forming the cylindrical dewatering drum. This provides a higher and more **consistent performance** compared to the conventional screw press with wedge wire basket.

VOLUTE Duo™ is the further evolution with significant **improvement of the life span** of the consumables, lower risk of blockage, with **twin screw** in one cylinder, increasing its application ranges dramatically.

©AMCON Europe s.r.o. 2020

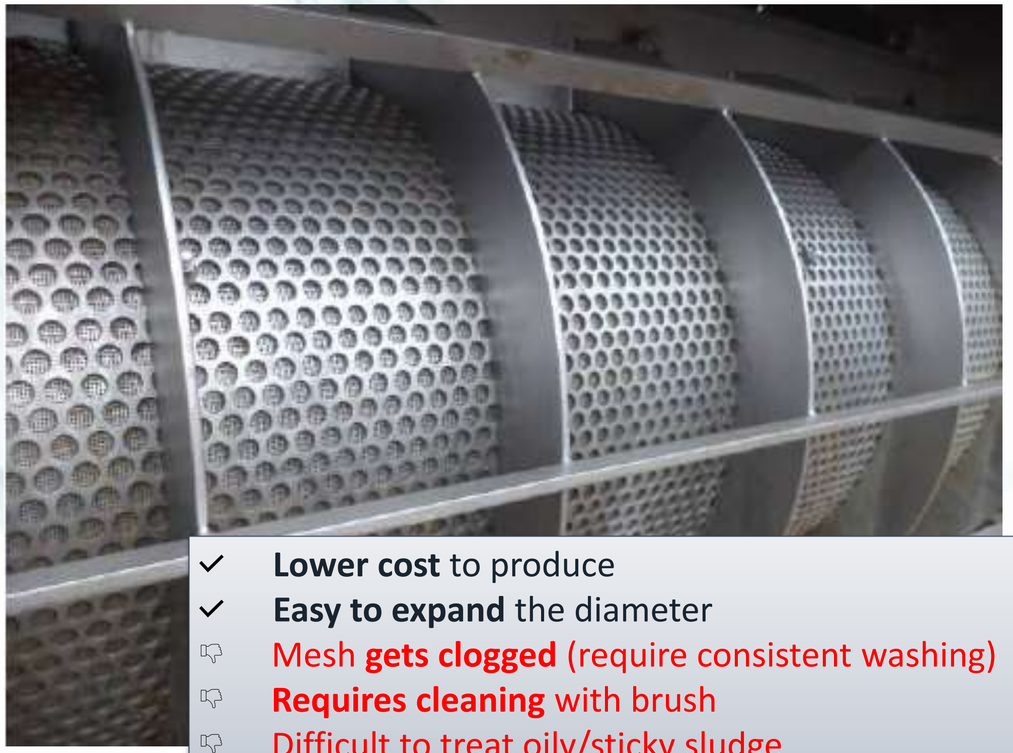
VOLUTE™ vs Screw Press

VOLUTE™



- ✓ **Self-cleaning** filter mesh requires no consistent washing (no brush, washing only 2-3 min/hour)
- ✓ Moving Rings cutting into sludge, making **sludge cake drier**
- ✓ **Resistant** to oily sludge
- ✓ Smaller design
- 👎 Difficult to expand the diameter of the cylinder
- 👎 Blocking with high fiber and high inorganic sludge

Conventional Screw Press



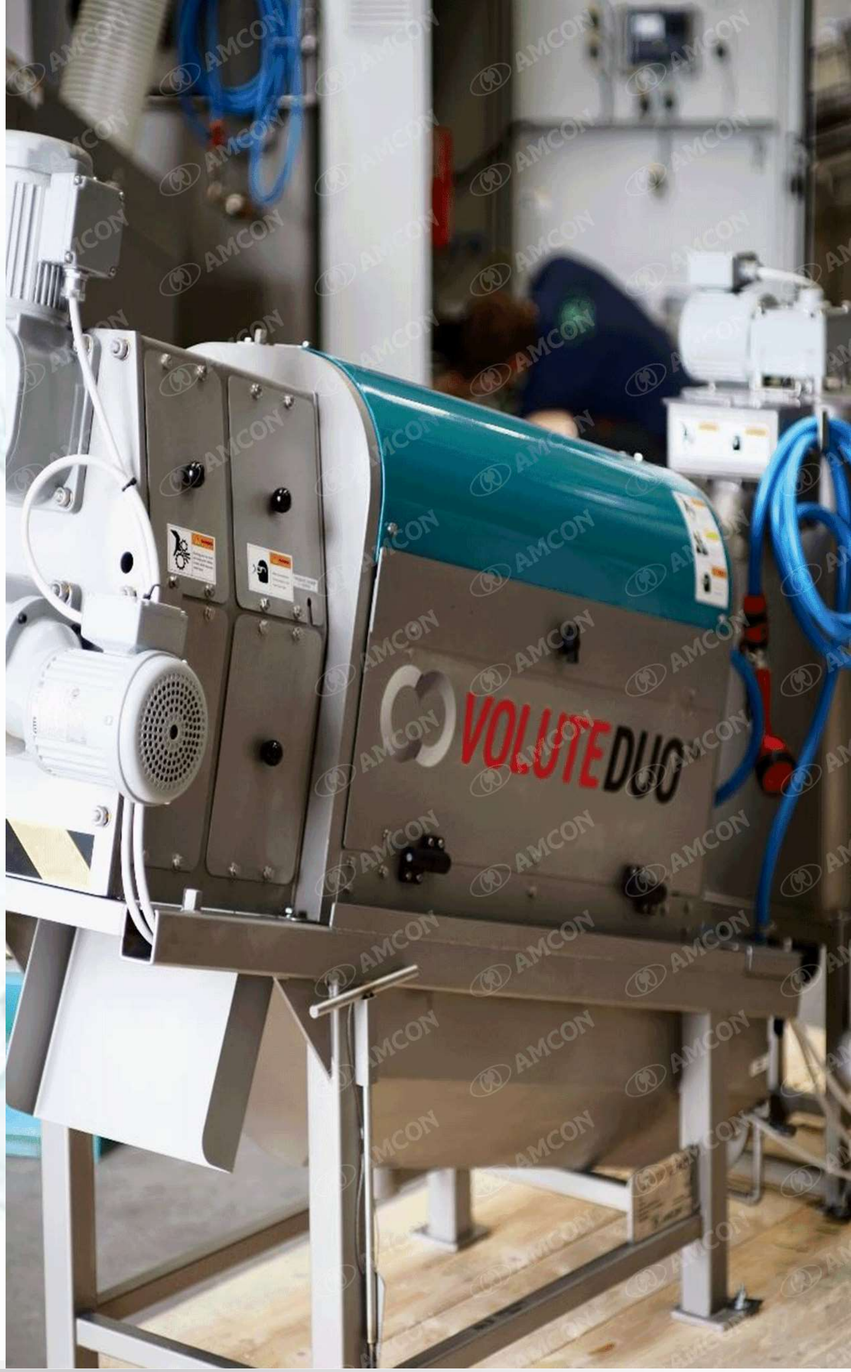
- ✓ **Lower cost** to produce
- ✓ **Easy to expand** the diameter
- 👎 Mesh **gets clogged** (require consistent washing)
- 👎 **Requires cleaning** with brush
- 👎 Difficult to treat oily/sticky sludge
- 👎 Blocking with high fiber and high inorganic sludge

©AMCON Europe s.r.o. 2020

New Benefits of VOLUTE DUO™

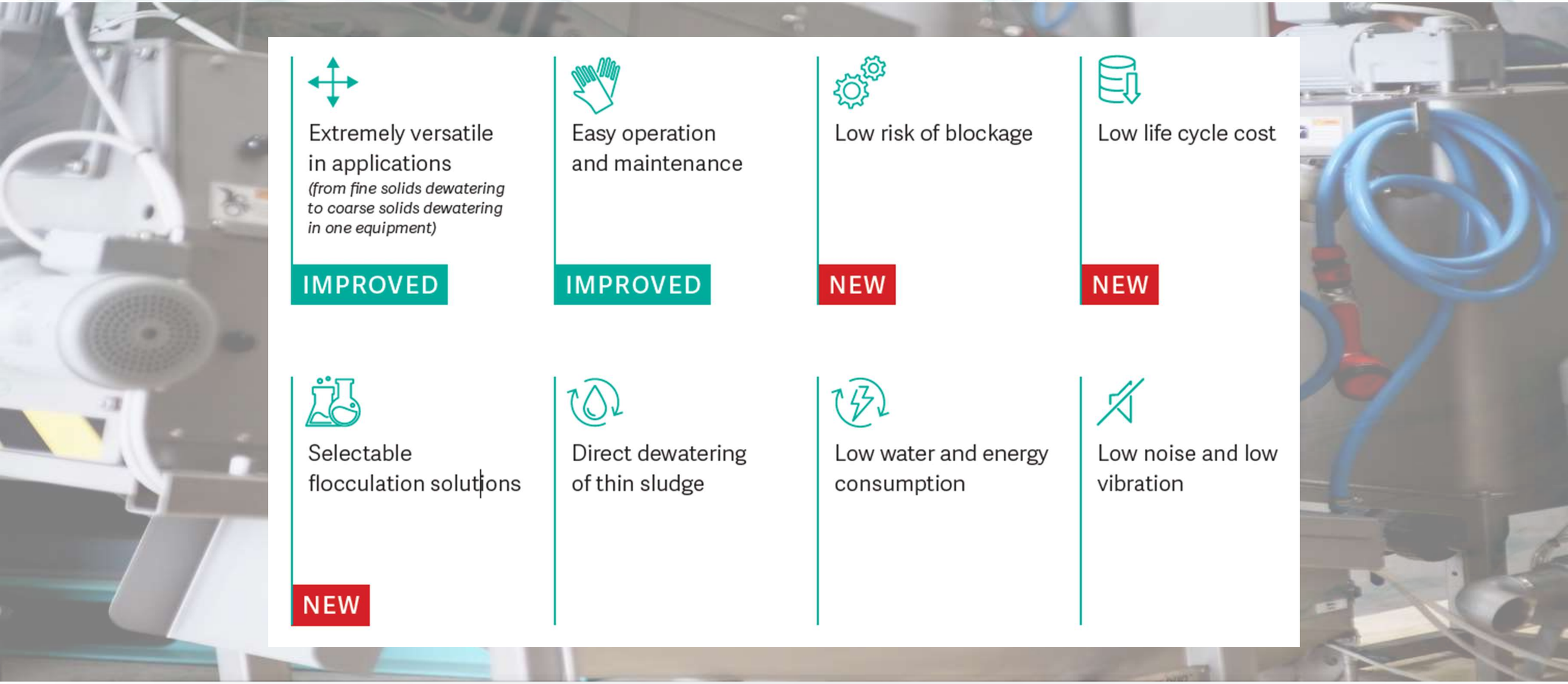
Keeping all existing benefits of VOLUTE™

- **Higher throughput** models realized for a **more competitive price**
- **Wider application range** – thanks to the twin screw, the screw blockage problem is removed and the applicable kinds of sludge increase, meaning customers with certain applications who were not able to use VOLUTE before™ can also enjoy VOLUTE™ technology
- **Completely improved life cycle cost**
  - Screw is no longer a consumable and the life span of Moving Rings should dramatically increase
  - Newly added consumables are low-cost and easier to replace
- **Selectable flocculation solutions** for best performance and cost



©AMCON Europe s.r.o. 2020

Total Benefits of VOLUTEDUO™



Extremely versatile in applications
(from fine solids dewatering to coarse solids dewatering in one equipment)

IMPROVED

Easy operation and maintenance

IMPROVED

Low risk of blockage

NEW

Low life cycle cost

NEW

Selectable flocculation solutions

NEW

Direct dewatering of thin sludge

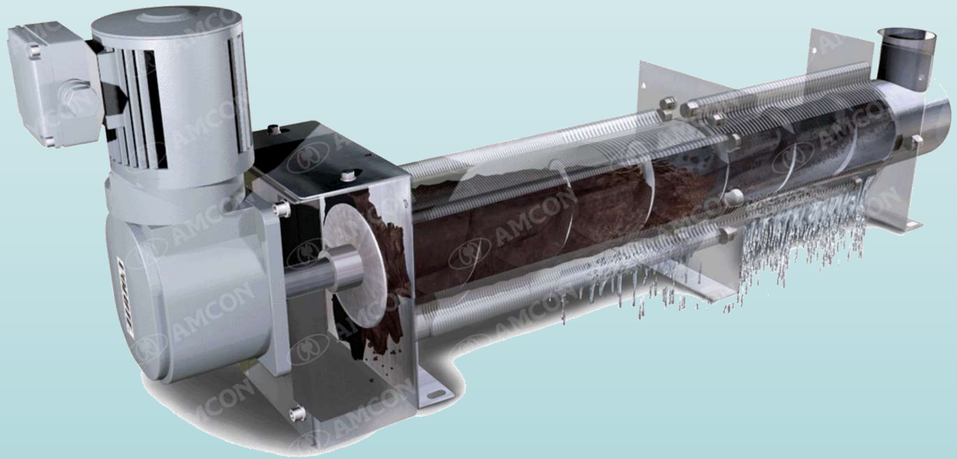
Low water and energy consumption

Low noise and low vibration

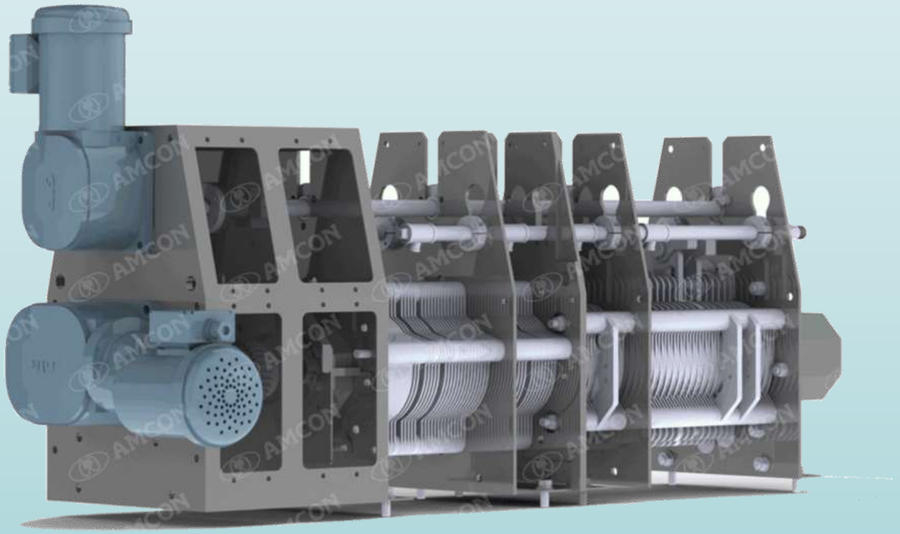
©AMCON Europe s.r.o. 2020

A New Cylinder Innovation

VOLUTE™



VOLUTE DUO™



©AMCON Europe s.r.o. 2020

VOLUTEDUO™ Cylinder Innovation

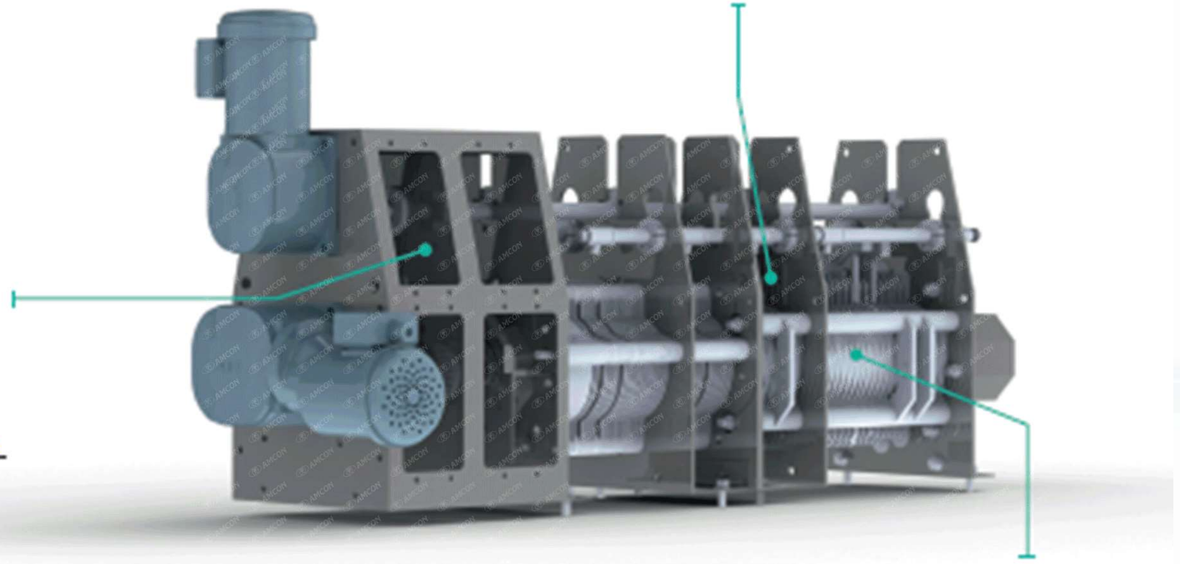
Twin screw

Twin Screw flights break up sludge and push sludge forward reducing risk of blockage to minimal level even for sludge with fiber or high inorganic content.

Patented

Double-cutting

The alternative up & down movement allows extra pressure on the sludge or various kinds of slurry.



Contactless design

Moving Rings are driven by external drive shaft, making no contact with Screw flights, thus eliminating possibility of wearing of Screws and Moving Rings significantly.

©AMCON Europe s.r.o. 2020

Flocculation Tank Improvement

VOLUTE DUO™ Improvements*

- **Reducing footprint** of the tank by avg. 48%
- Reducing polymer consumption **by 10 to 30%**
- More **secured operation** (pressor sensor vs. electrode probe)

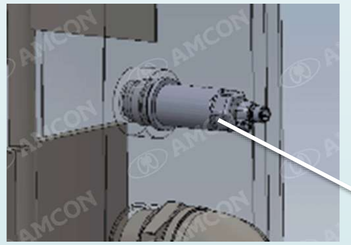


Fig. 2
Hydrostatic Pressure Sensor for Tank Level

Fig. 3
Dynamic Mixer for Enhanced Performance

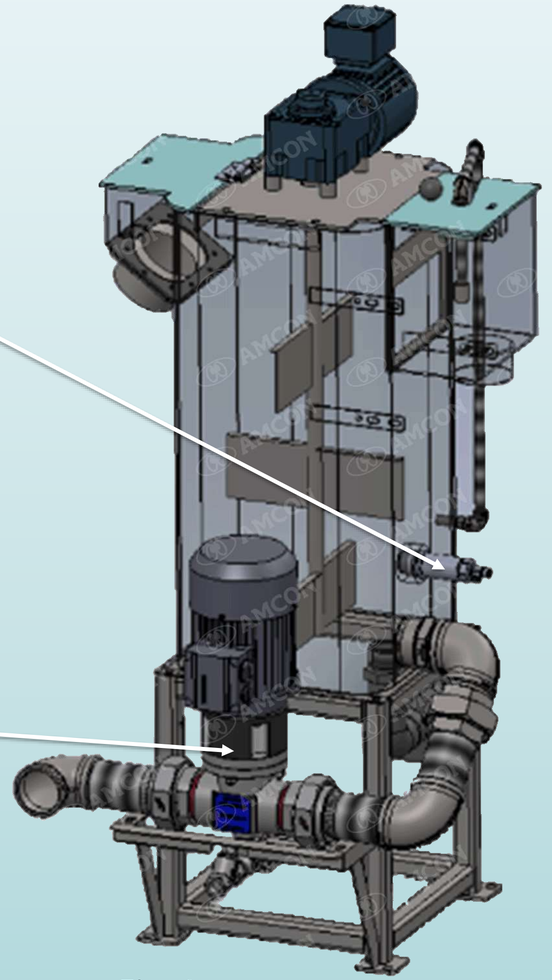
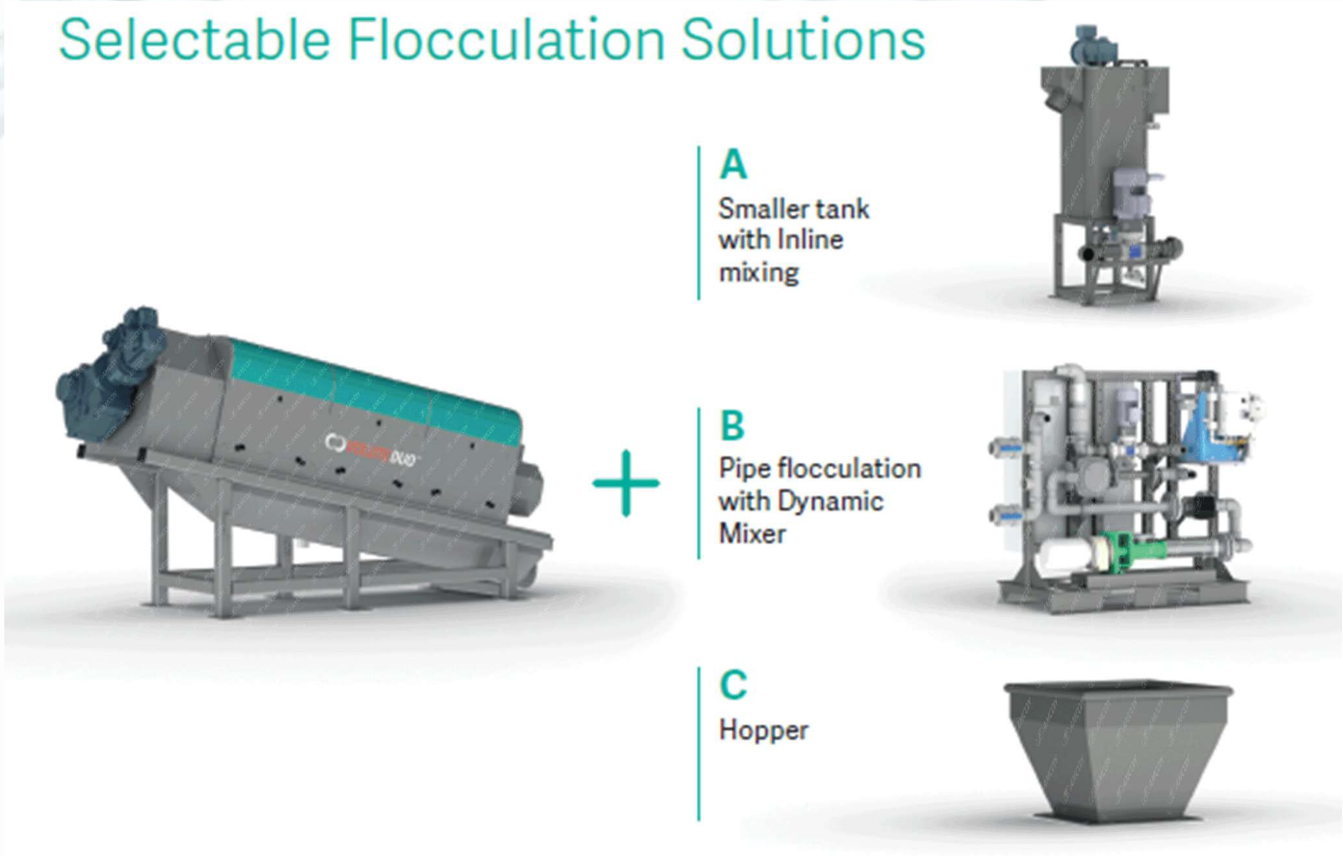


Fig. 1
Flocculation tank

*Based on tests AMCON conducted. Numbers vary depending on each application.

©AMCON Europe s.r.o. 2020

Wider Application, Wider Choices



Sludge types	Smaller tank with DM	Pipe flocculator with DM	Hopper for high solids
DAF	X		X
WAS	X	X	
Chemical sludge (inorganic)	X	X	
High solid waste			X
Fiber sludge (e.g. raw manure)	X	X	X

©AMCON Europe s.r.o. 2020

Wider Application, Wider Choices

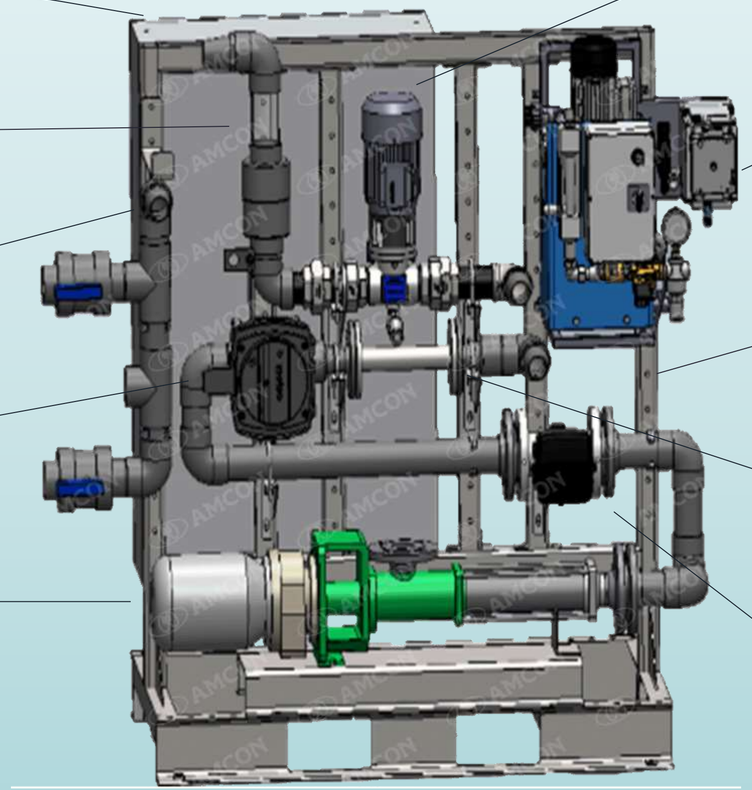
Control Panel

Flocc. Viewing Point

Overpressure Sensor

TS meter

Sludge Pump



Dynamic Mixer for Enhanced Performance

Inline Liquid Polymer Station

Adjustable mounting bracket/bars

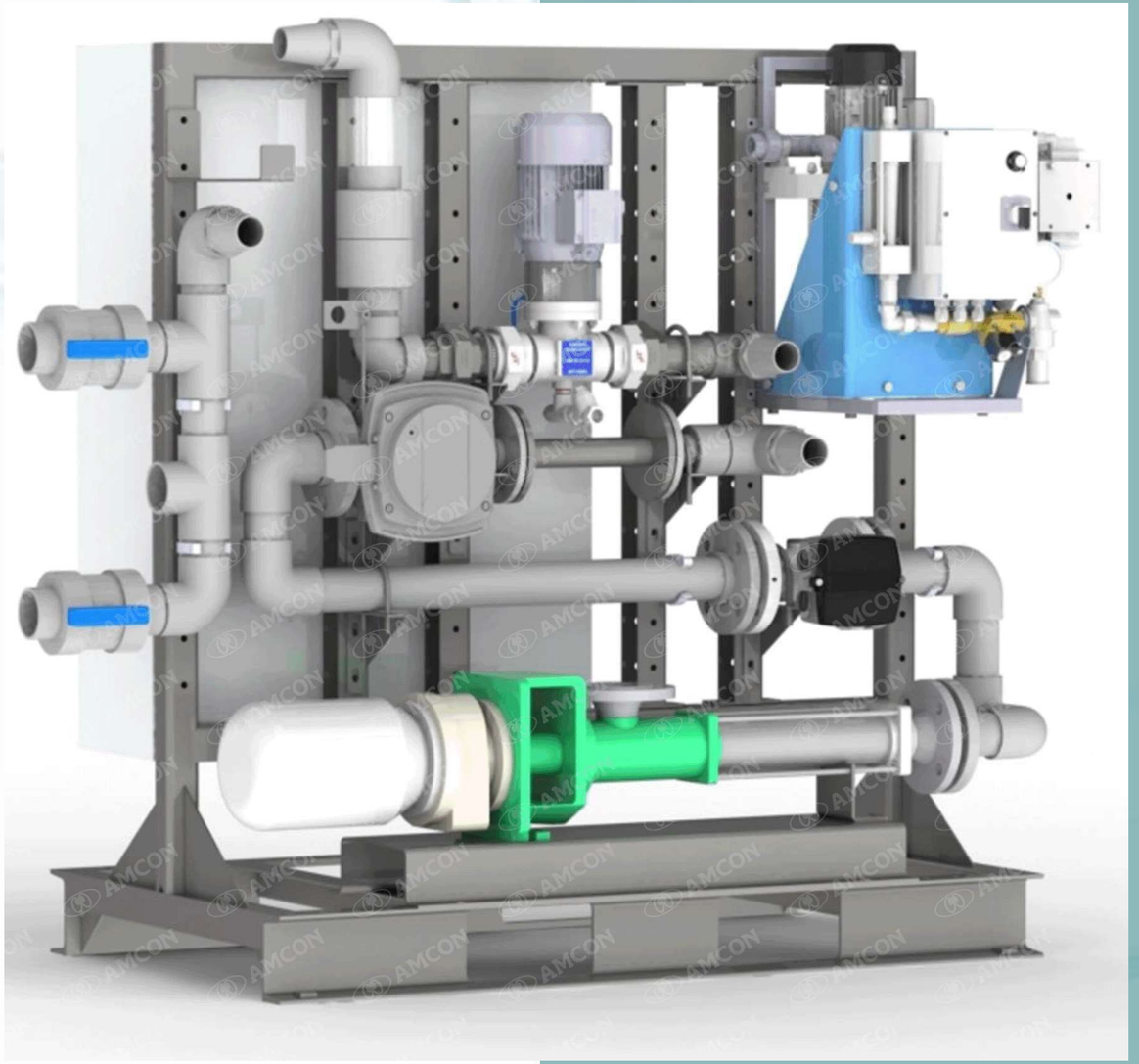
Static Mixer (Coagulant)

Flow Meter

©AMCON Europe s.r.o. 2020

Wider Application, Wider Choices

- All-in-one **compactness**
- Significantly **smaller footprint** compared with tank solution
- Electricity saving
- Significantly **cost-effective** for large throughput model
- **Polymer dosage reduction** by Inline mixing
- Saving **installation cost**



©AMCON Europe s.r.o. 2020

Cylinder Base

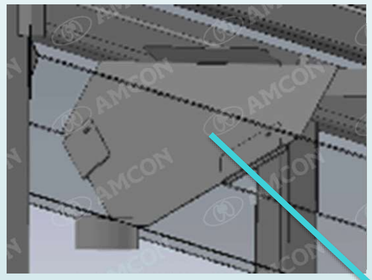


Fig. 2
Removable
Split-pan divider

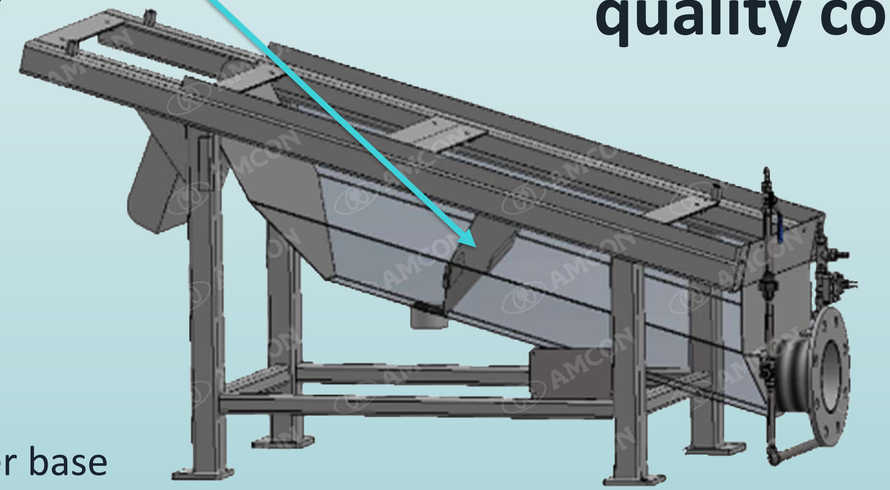


Fig. 1
Cylinder base

Simpler design and **lower cost**.

Simple removable split pan function for **better filtrate quality control**.

©AMCON Europe s.r.o. 2020

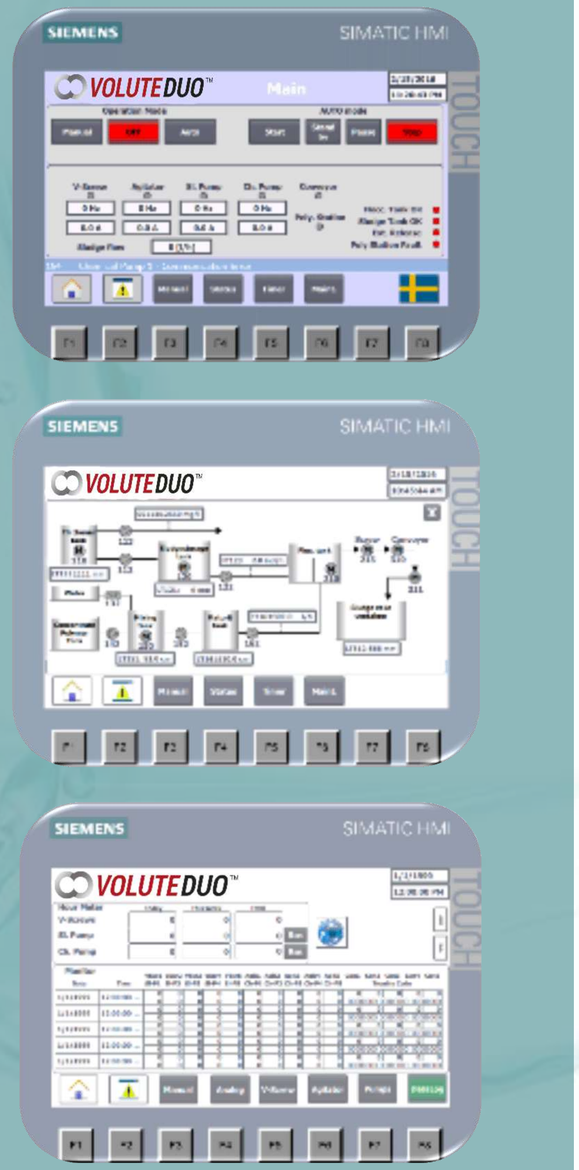
Control Panel for New Normal

Increasing needs of automation/IoT

- **Sensor technology** => more accurate/affordable
- **Process Automation** => new normal to have automated process, Remote monitoring/control.

Ever-growing needs to make operation easier & simpler

- **Changing Sludge condition** = > automatically adjusted for optimal performance without human intervention (stable consistent output, optimal polymer dosage = save chemicals cost)
- **Lack of operators, higher cost** => increasing remotely operated plants



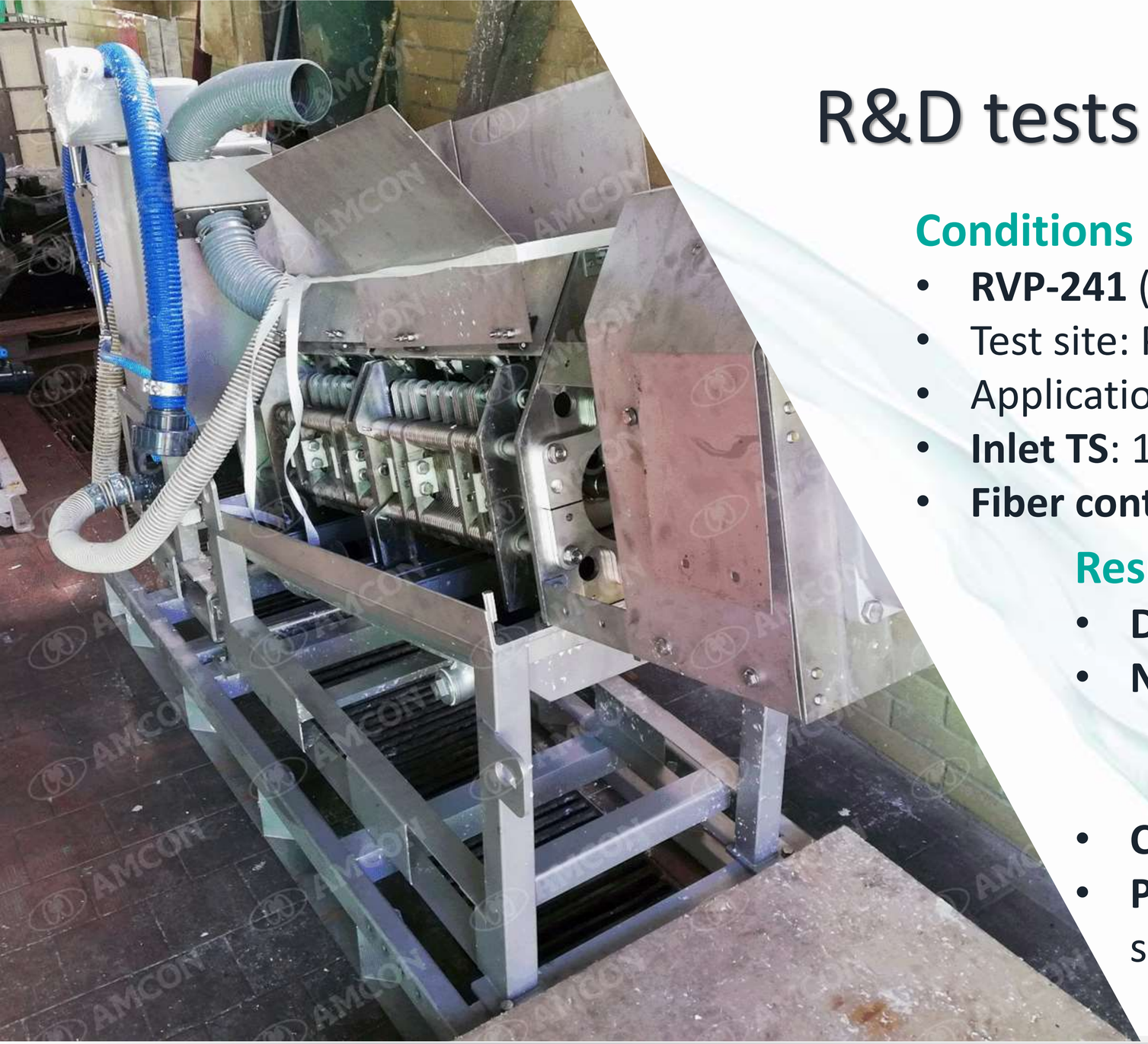
©AMCON Europe s.r.o. 2020

VOLUTE DUO™ Line-up (tentative)

VOLUTE DUO™	Estimated throughput (WAS) kg-DS/h	VOLUTE™	FS throughput (WAS) kg-DS/h
		FS-101	3
		FS-131	6
RVP-241	12	FS-132	12
		FS-202	26
		FS-301	30
RVP-501	60	FS-302	60
RVP-601	120	FS-352	120
RVP-701	180 – 260*1	FS-402	200
RVP-801	220 – 315*1	FS-452*2	-
RVP-802	440 – 630*1	FS-454*2	-

*1 The throughput needs review after a few more tests, especially for these sizes of the models.
*2 These models do not exist. Only provided for theoretical comparison.

©AMCON Europe s.r.o. 2020



R&D tests – Paper Sludge

Conditions

- **RVP-241** (Design throughput 12 to 20kg-DS/h)
- Test site: Paper mill in Czechia
- Application: precipitated paper sludge
- **Inlet TS**: 1.5%
- **Fiber content**: 60% +

Results

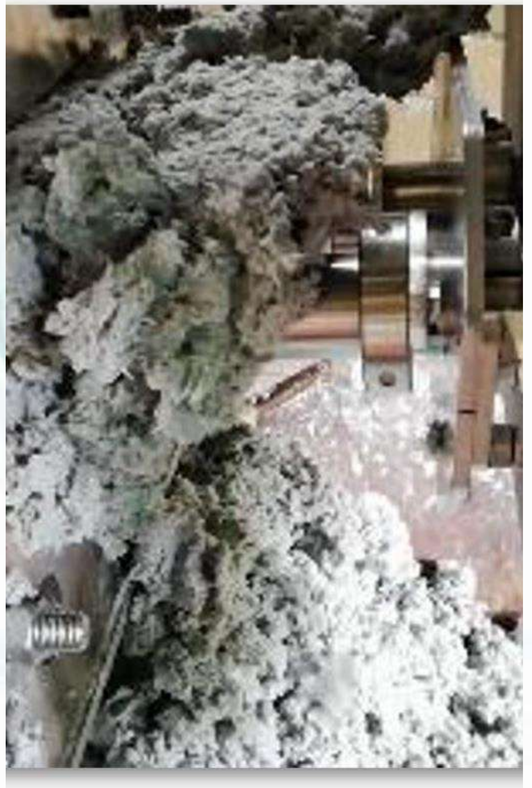
- **Dryness 25-30%** with design throughput
- **No blockage** with up to 30% DSC
  - For comparison, GS-132 tested and the cylinder blocked at 16% DSC
- **Capture rate**: above 99% all the time
- **Poly dosage**: 14g active/kg-DS (floc to be slippery enough

©AMCON Europe s.r.o. 2020

R&D tests – Paper sludge

Observation

- Sludge contained extremely **high fiber** (60%+)
- The test showed the **upper limit** of fiber content even for VOLUTE Duo



©AMCON Europe s.r.o. 2020

R&D tests – Synthetic sludge

Conditions

- **RVP-601**
- Sludge type: synthetic sludge with **high inorganic content**

Results

- Dewatering up to **40% DSC** with **no blockage**

©AMCON Europe s.r.o. 2020

R&D tests – Chemical sludge (inorganic)

Conditions

- **RVP-241**
- Sludge: TS 1%, Inorganic content 75 to 90%, cyanide production

Results

- Dewatering up to **22% DSC** without **no blockage**

©AMCON Europe s.r.o. 2020

Question time

©AMCON Europe s.r.o. 2020