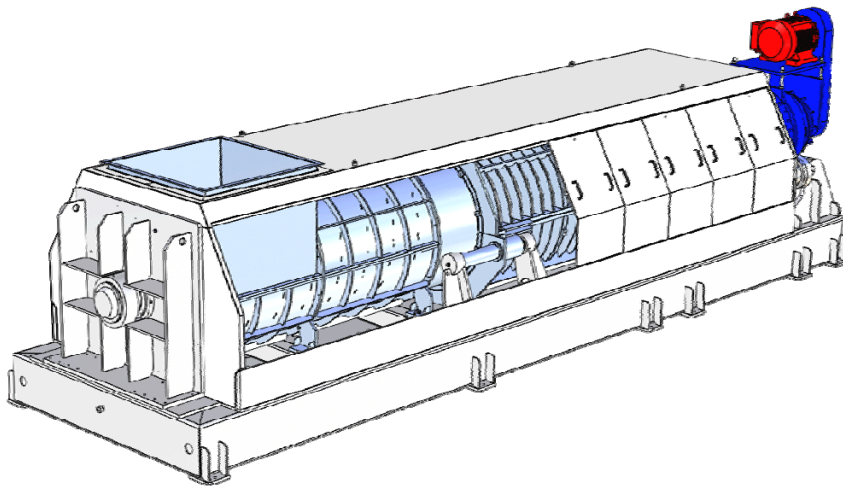




### TECHNICAL INFORMATION

## AKUPRESS® X – SCREW PRESSES

### - DEWATERING



### AKUPRESS® X

The high-end screw press for dewatering of structured matters

**AKUPRESS® AX** for coarse-structure rejects and residues

**AKUPRESS® BX** for fine-structure residues and sludges

**AKUPRESS® CX** for fibrous materials

- X-tra high dry contents
- Adaptation to the properties of the material to be dewatered by changing the pressing zone length, thereby keeping the torque at a constant level
- Independent control of throughput and driving torque
- Easy maintenance due to flanged shaft connection and interchangeable screen basket





## TECHNICAL INFORMATION

### AKUPRESS® X – FIELDS OF APPLICATION

There are three standard screw press types for different fields of application. Whereas the principle of operation and the advantages for the user are the same, parameters such as torque, speed and screw geometry are adjusted to the individual application:

#### **AKUPRESS®AX**

**for coarse-structure matters (particle size of up to approx. 70 mm)**

Dewatering and separation of

- fractions from organic and grey waste treatment
- other solid/liquid mixtures containing coarse particles

Dewatering of stocks from the pulp and paper industry:

- rejects from chemical and mechanical pulp mills
- fine rejects and shredded coarse rejects from waste paper preparation
- fibrous sludges with a freeness of < 70 CSF

#### **AKUPRESS®BX**

**for fine-structure matters and sludges (particle size of up to approx. 20 mm)**

Dewatering of structured sludges and fine-structured mixture of materials coming from Pulp&Paper industry applications, featuring inlet consistencies starting from 6%, e.g.:

- mechanical / biological sludges from effluent treatment
- mechanical sludges from deinking plants
- mechanical sludges from waste paper washing processes
- mechanical sludges from waste paper stock preparation

#### **AKUPRESS®CX**

**for fibrous materials**

Dewatering of fibrous materials with inlet consistencies > approx. 3%:

- from chemical and mechanical pulp mills at a freeness of 50 – 800 CSF
- from waste paper preparation
- natural fibres such as linters, rags
- chemical fibres, viscose, etc.



## TECHNICAL INFORMATION

The maximum final dry contents that can be achieved with **AKUPRESS® X** depend upon the nature of the material to be dewatered, such as fibre content, type and content of inorganic components as well as the pre-treatment process.

In addition, the dry content is also determined by the relative throughput of the press.

The following figures shall serve as a general guide, assuming average throughput:

### Type **AKUPRESS® X** **Dry content**

Classification of the materials to be dewatered

#### **AKUPRESS® AX**

Residues from waste treatment	50 – 70 %
Rejects from chemical and mechanical pulp mills	50 – 60 %
Bark	45 – 55 %
Fine rejects and shredded coarse rejects from waste paper preparation	60 – 80 %

#### **AKUPRESS® BX**

Mechanical sludges	
Ash content 0 – 30%	50 – 63 %
Ash content 30 – 60%	58 – 70 %
Mech./biological sludges	45 – 65 %
Sludges from deinking plants and from waste paper washings	60 – 70 %

#### **AKUPRESS® CX**

Fibres from chemical and mechanical pulp mills	approx. 50 %
Deinked waste paper (ash approx. 10 %)	approx. 55 %
Natural fibres	approx. 50 %
Chemical fibres	approx. 50 %



### TECHNICAL INFORMATION

#### SHEAR RESISTANCE

**A sufficient shear resistance is essential for efficiently using a screw press.** This requires a minimum content of fibrous materials to form a supporting structure, such as structured matters, fibres or fibre fragments. The shear resistance is particularly impaired by high contents of

- biological sludges,
- fillers, colour pigments, coating materials
- or gliding components like peels

#### INSTALLING A PRE-THICKENER

For operational and economical reasons low inlet consistencies call for a thickener (e.g. **AKSE®-S/F** disc thickener) to be installed upstream of the screw press. On the one hand, this ensures the feeding process inside the press. On the other hand, this helps increase the capacity of the press, or a smaller unit may be used.

#### FLOCCULATION

Before dewatering, the sludges need to be flocculated. At present, this is mainly done by using polymer flocculents, e.g. polyacrylamides.

Flocculation takes place at the beginning of the dewatering process, i.e. directly before the pre-thickener or pre-drainage unit. Two points require special attention:

- The flocculated sludge should not be kept too long between the different dewatering stages since this will decrease the effect of the flocculent.
- The flocculated sludge must not be subjected to severe shear as the flocks may be destroyed.

To assure that the flocculent can ideally be added to the sludge, BELLMER KUFFERATH Machinery offers a flocculation reactor that at the same time allows to visually check the forming of flocks.



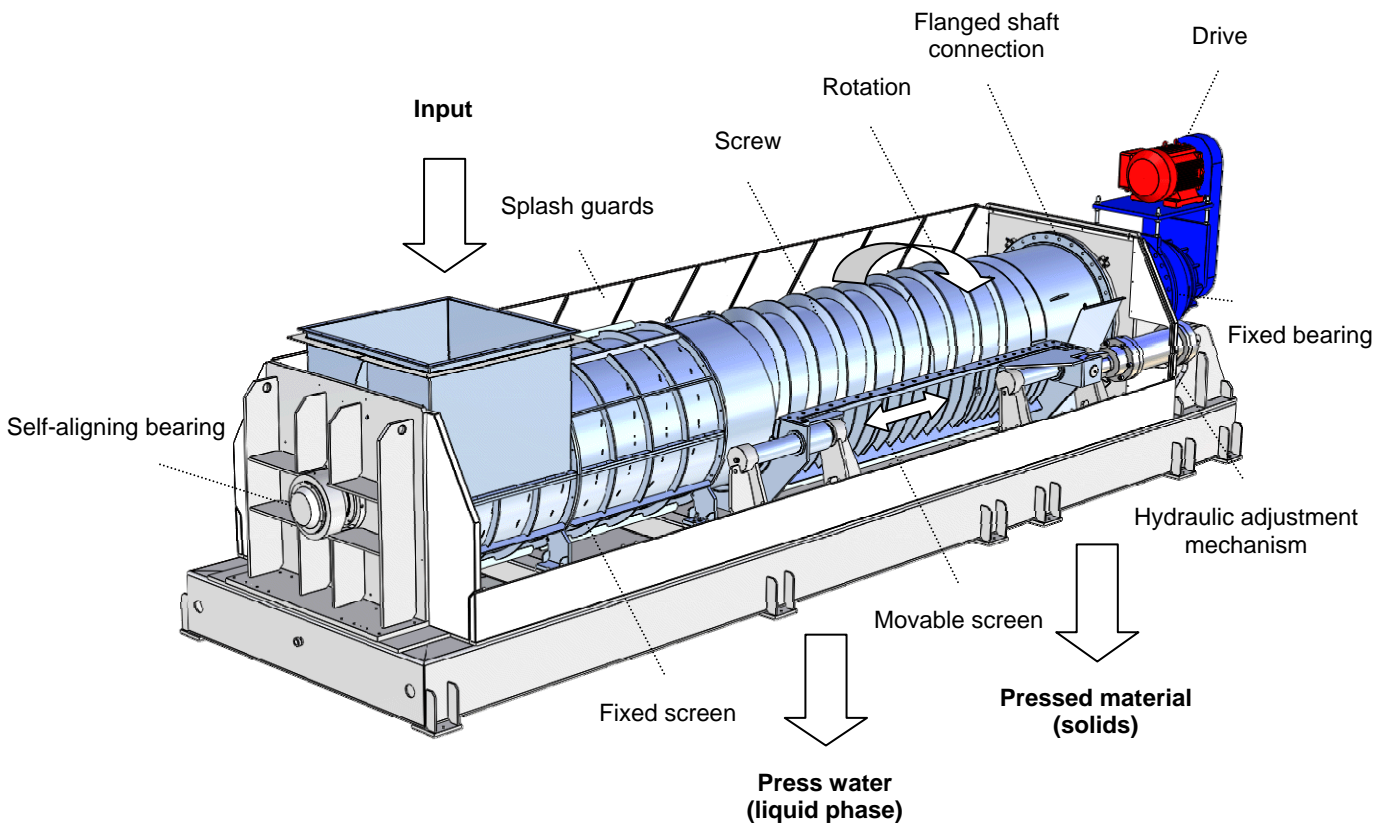
### TECHNICAL INFORMATION

## AKUPRESS® X – OPERATING PRINCIPLE

**AKUPRESS® X** are dewatering presses specifically designed to reach optimum dry contents. The main constructional parts are shown in the sketch at the bottom and explained in detailed below.

The material to be dewatered is fed to the screw press via an inlet chute. The screw then propels the material towards the press outlet that is formed by a spiral-free area, the so-called pressing zone. In the pressing zone the friction between the solids, the screen and the shaft throttles the flow and builds up a counterpressure against the conveying section. This pressure drives the free water of the material treated through perforations of the basket enclosing the screw. Solids are retained and expelled by the screw through the press exit aperture.

A characteristic feature of the **AKUPRESS® X** is the variable pressing zone and the fact that the pressure may be controlled by changing its length. Throttling is exclusively made over the length of the pressing zone. By changing the length of the pressing zone, the press can always be operated at constant torque, independently of the properties of the material to be dewatered and the throughput. This gives a largely constant dry content.

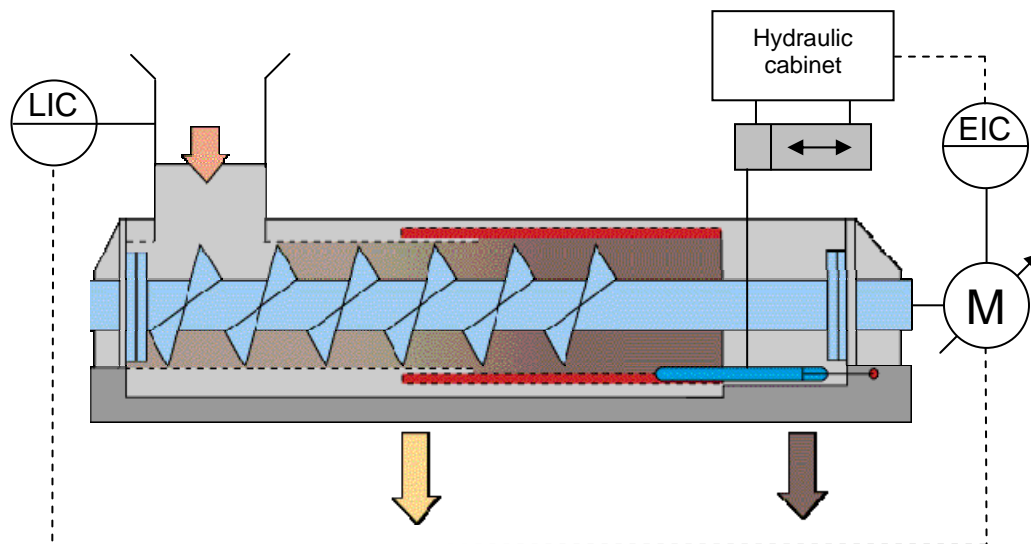




### TECHNICAL INFORMATION

The standard **AKUPRESS® X** line is equipped with the following automatic control systems:

- Level control in the inlet chute by adjustment of the screw speed  
= adaptation of throughput
- Torque control by adjustment of the screw basket position  
= adaptation of pressure





### TECHNICAL INFORMATION

#### FUNCTIONAL CHARACTERISTICS and ADVANTAGES

The perforated screen is axially displaceable, thus the length of the pressing zone may be changed by a hydraulic drive during operation.

- The throttling action of the pressing zone is continuously adapted to the properties of the material to be dewatered that may vary in many cases.
- The press may be completely discharged before standstills or if there are any troubles. Thus no plug remains in the press.
  - the press may be started without load
  - the material to be dewatered will not freeze even if the installation is situated outdoors
  - simple inspection of the spiral in the pressing zone (e.g. wear test)
- By modifying the position of the perforated screen, the driving torque may be controlled independently of throughput and speed of the screw.

**Screw shafts with low spiral heights in the pressing zone; high drive power and torques**

- Optimum dry contents

**Different screw geometries possible.**

- Allowing to offer a press most suitable for different materials depending on consistency and particle size

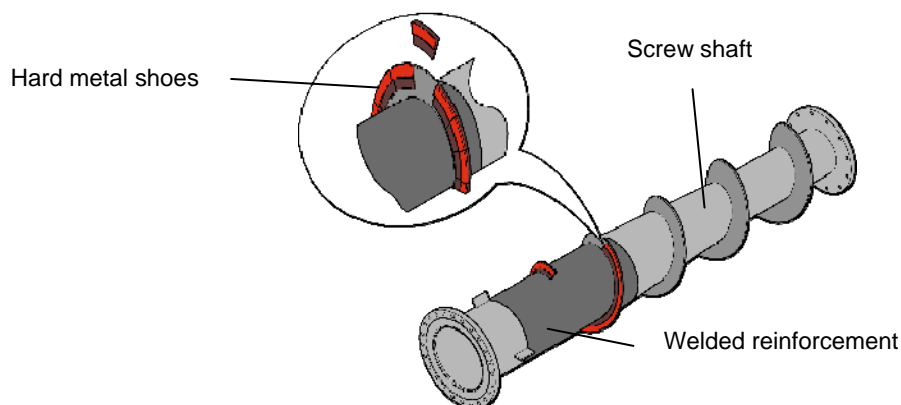
**The screw rotation speed is automatically set to the lowest possible value for the inflowing quantity and dewatering properties of the material to be dewatered.**

- Low solids content in the press water
- Low power consumption
- Minimum wear

#### DESIGN CHARACTERISTICS

To protect the spiral heights against wear in the pressing zone, they are either provided with a special reinforcement / replaceable, coated L-form wearing shoes on the screw flights (AKUPRESS BX 1000/1400) or so-called hard-metal shoes that are screwed on.

- Adaptation of the wear protection to the properties of the material to be dewatered.
- Economically optimized wear protection



Flanged connection of the journals to the screw shaft

- Rapid exchange of the screw without dismantling the bearings

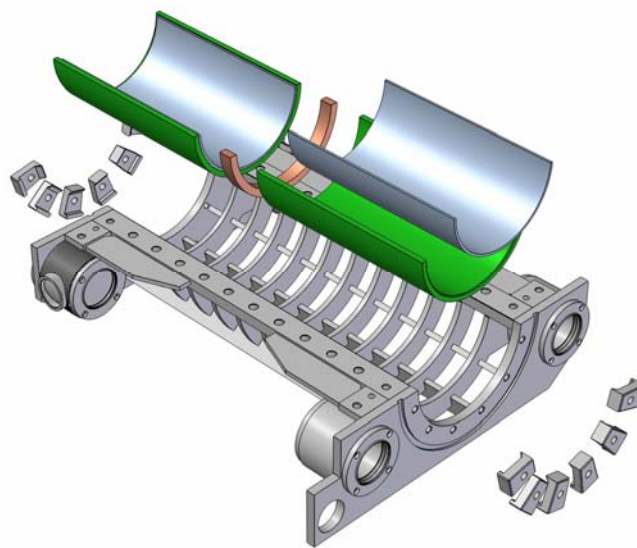
By using different screen basket perforations (from 1.5 to 10 mm) the screw press can ideally be adapted to the individual requirements/products.



### TECHNICAL INFORMATION

In the pressing zone the movable screen basket frame splits horizontally. The operational screen baskets (half-shells) are welded each into a support basket which is then fixed into the screen basket frame (interchangeable screen basket system).

- Rapid exchange of the screen baskets without any welding inside the machine.
- As a wear part, the operational screen basket is detached from the supporting frame.



Interchangeable screen basket system

The frame is supported by bushes on two circular guides and moved by means of a hydraulic cylinder.

The distance between pressing zone/drive and pressing zone/fixed bearing (combined radial/thrust bearing) is only small as the drive is located at the exit of the press.

- Reduced load and deflection of the screw shaft

The drive consists of a slip-on planetary gearing and a standard three phase motor. The speed of the screw rotations is controlled via frequency converter.

At the inlet, the journal has a special separate seal ensuring that the screw press can be operated with pressure coming from the inlet without damaging the journal.

Option: spray pipe for cleaning the screen from the outside as well as for cleaning the press water tub.





### TECHNICAL INFORMATION

## AKUPRESS® X – DATA

### LABELLING OF AKUPRESS® X

**AKUPRESS® AX D LL/LS**

**AKUPRESS® BX D LL/LS**

**AKUPRESS® CX D LL/LS**

**AX** - dewatering of residues and rejects

**BX** - dewatering of sludges

**CX** - dewatering of fibrous materials

**D** - screw diameter (mm)

**LL/LS** - long/short version

**AKUPRESS® AX, BX and CX** are basically identical in terms of functional and design characteristics. Due to the most different matters to be dewatered, however, they differ in speed of rotation (driving power), screw geometry and design as well as screen basket perforation.

### Available sizes

All **AKUPRESS® X** models can be supplied with screw diameters ranging between 250 and 1,400 mm and in short or long version.

**TECHNICAL INFORMATION****TECHNICAL DATA**

<b>AKUPRESS® X (LL and LS)</b>	<b>250</b>	<b>400</b>	<b>625</b>	<b>1000</b>	<b>1400</b>
Screw diameter [mm]	250	400	625	1000	1400
Spiral height [mm]	Depending on the application				
Perforation screen basket [mm]	1.5-5 depending on the application				
<b>AKUPRESS®AX</b>	LS				
- Screw shaft	conical				
- Speed of rotation [1/min]	11 - 33 37	7 - 21 55	4 - 13 90	3 - 8 132	2 - 6 200
- Installed power [kW]	11 - 31	17 - 50	26 - 78	42 - 126	58 - 174
- Power consumption during operation (depending on the speed) [kW]					
<b>AKUPRESS®BX</b>	LL				
- Screw shaft	conical				
- Speed of rotation [1/min]	4.4 - 14	2.8 - 9.0	1.3 - 4.2	0.8 - 2.7	0.6 - 1.8
- Installed power [kW]	18.5	30	37	55	90
- Power consumption during operation (depending on the speed) [kW]	4.2 - 14	6.7 - 22	7.5 - 24	13 - 42	17 - 54
<b>AKUPRESS®CX</b>	LL (LS)				
- Screw shaft	conical				
- Speed of rotation [1/min]	26 - 66	16 - 41	10 - 26	6.7 - 17	4.7 - 12
- Installed power [kW]	22 - 55	37 - 90	55 - 160	90 - 250	132 - 315
- Power consumption during operation (depending on the speed) [kW]	18 - 44	28 - 71	44 - 109	71 - 177	97 - 244
<b>all AKUPRESS® X</b>					
Hydraulic system					
- Installed power [kW] (duration of operation approx. 10 %)	1.5	4.0	5.5	7.5	11