

One Source

# FLSmidth Shriver® filter press products



# FLSmidth Shriver® filter presses lead the way

## Applications

- Minerals & hydrometallurgical
- Hazardous and metallic wastes
- Pharmaceuticals, chemical and petrochemical products
- Pigments and dyes
- Precious metals
- Ore processing
- Coal dewatering
- Water treatment
- Biological sludges
- Clarification of liquid
- Oilfield muds
- Food products and juices

### FLSmidth's latest Shriver® "FB" cost-effective filter press designs offer:

- Easy operation and maintenance
- Safe pneumatically or electrically operated controls
- Complete corrosion resistance
- Minimum weight and space requirements
- Maximum area and volume
- U.S. Technologies combined with local manufacturing and local service and OEM parts
- Over 100 years experience in process and design with over 30,000 installed units worldwide
- Qualified and experienced technical staff
- Flexibility in design
- Food-grade construction
- Efficient cake washing
- Driest cakes with membranes and/or air blow

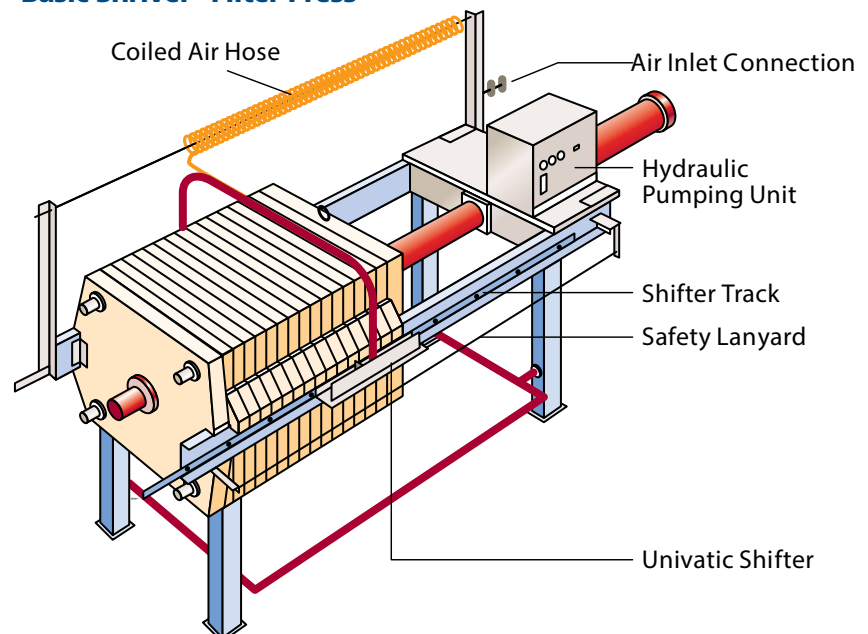
### For maximum dewatering

Filter presses date to the earliest means of removing liquids from slurries. For centuries, these devices have been modified and improved to today's technology. FLSmidth has kept pace by introducing many new features and innovations since the early 1900's. Years of experience and thousands of installations have resulted in a wide array of designs, features and styles of Shriver® filter presses. Variety of plates, skeletons, opening mechanisms, shifters, and special designs with patented Shriver options provides FLSmidth the knowledge and experience to handle the most complex to the simplest application. An experienced sales and service team, with outlets in major cities, is dedicated to the need of the customer. You are assured FLSmidth has the expertise and resources to provide the best design to suit your requirements.

### Typical filter press operation

Filter presses offer drier cakes at lower cost than other dewatering devices. They consist of two basic components; a skeleton frame and a plate stack. Regardless of the construction or methods of control and operation, filtration is achieved by clamping the plates together and pumping slurry under pressure into the cavities formed between the closed plates. Filter media lines the chambers and captures solids while permitting clarified liquid to pass through. Filtration proceeds until the cavity is filled with cake or a preset pressure is reached. By unclamping and shifting the plates, the cake drops from the cavities and the filter is ready to repeat the operation. Filtration rate is dependent on feed pressure, thickness of the cake, slurry temperature and viscosity, nature of the cake solids, and filter media.

### Basic Shriver® Filter Press



# FLSmidth Shriver® filter press skeleton configurations



Overhead Beam Filter



Sidebar Filter

Design	Benefits	Drawbacks
<b>Side bar</b>	<ul style="list-style-type: none"> <li>• Low Cost</li> <li>• Easier access to shifter components for maintenance</li> <li>• Lower overall height profile</li> <li>• Lighter weight</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired view and access to plates</li> <li>• Higher theoretical side bar stresses</li> <li>• Less dimensional stability due to only two point sidebar contact</li> <li>• Shifter mechanism subject to process contamination</li> <li>• Fewer number of plates per filter</li> </ul>
<b>Overhead beam</b>	<ul style="list-style-type: none"> <li>• Full view and access to plates</li> <li>• Plate removal from side or top of filter</li> <li>• Higher dimensional stability due to four point sidebar contact</li> <li>• Lower theoretical side bar stresses</li> <li>• Shifter components not subject to process contamination</li> <li>• Larger number of plates per filter</li> </ul>	<ul style="list-style-type: none"> <li>• Higher cost</li> <li>• More difficult access to shifter components for maintenance</li> <li>• Higher profile</li> <li>• More weight</li> </ul>

## Filter frames

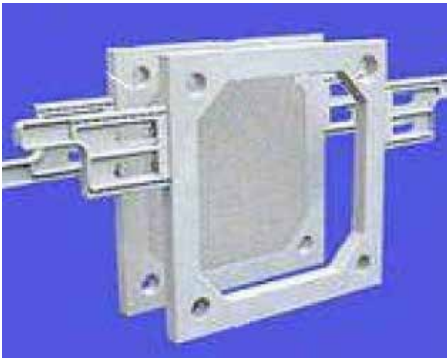
Metal skeletons are normally constructed of fabricated mild steel, although other materials can be specified. Both side bar and overhead designs are available as standard.

# Shriver plate types, materials, porting arrangements & plate shifter designs

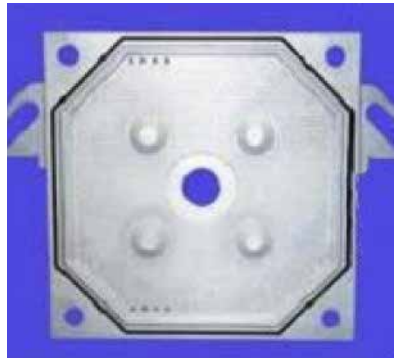


Typical Recessed Chamber Plate

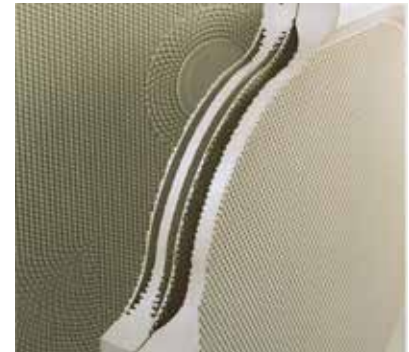
Either typical or unique applications can obtain the most cost-effective plate stack from an almost endless array of Shriver combinations. Normally, polypropylene construction, using a recessed or CGR (Caulked, Gasketed and Recessed) plate will satisfy the requirements of most applications. But if you have a special situation, FLSmidth can offer any of four plate types, many materials of construction, open or closed discharge with either center or corner feed, and numerous special porting arrangements for cake washing, air blowing, liquid sampling, etc.



Typical plate and frame



CGR Gasketed Plate



Typical membrane plate

## Plate options

Types	Materials of construction
Plate and Frame	Polypropylene and polypropylene blends
Recessed Chamber Plate	High temperature polypropylene
CGR (Caulked Gasketed Recessed)	Nylon
Membrane	Kynar
	Iron
	Non-Ferrous metals
	Stainless Steel, cast
	Stainless steel, fabricated
	Polypropylene membrane or rubber membrane on polypropylene body plates
Notes	
(1) Maximum Pressure rating selections are 100 PSIG to 225 PSIG	
(2) High temperature materials available	

Types of Shriver® filter plate shifters	Advantages
Double-acting cylinder (Hydrashift™)	High-speed, cost-effective shifting for plate stacks up to 100 CHMB
Univatic™	Manual Assist — one man can do the work of two — up to M1200 size
ALP™ (Automatic Large Plate)	Full automated shuttle shifter for very large plates or very long plate stacks — overhead beam or side bar filter designs

### Options to suit the application

Often the design of the plate shifter is directly responsible for the operational efficiency of the filter press. No single shifter design can be effective for every application. Consequently, FLSmidth offers several shifter designs so your application can obtain the highest level of efficiency possible. Shifters are available in either manual or automatic controlled operation.



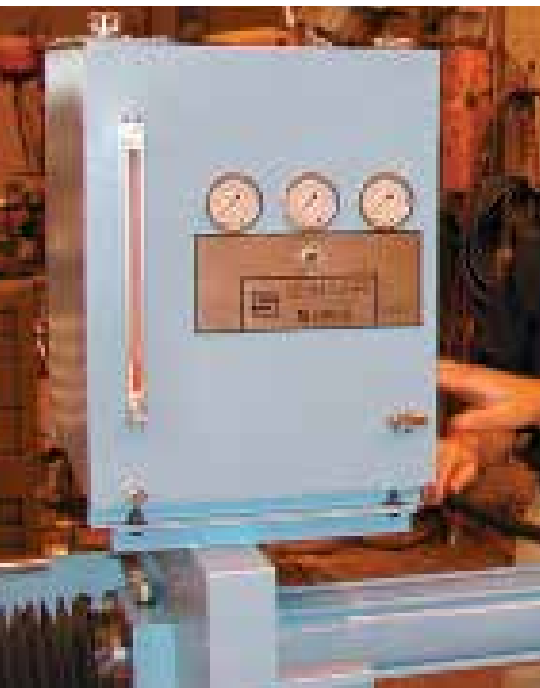
Top right: Univatic™ Shifter  
Bottom Right: Hydrashift™ Shifter



Above: ALP™ Shifter with standard Heavy Duty SS Investment cast shifting carriage for reliable shifting of the heaviest plates.



# FLSmidth leading the way with Shriver closing mechanisms



## For all applications

Whether you require a “standard” 100 PSI feed pressure, a 225 PSI high pressure, or a special design, FLSmidth has the Shriver closing device suitable for the application. FLSmidth has built Shriver closing mechanisms for most pressures in a variety of styles. From manual operation to highly complex automatic operation with sophisticated safety features.

FLSmidth’s Shriver standard sidebar filter press models use an air-oil hydraulic system for the double-acting (oil to open + oil to close) cylinder closing mechanism. This system simplifies manual operation, eliminates the need for electrical controls, while still enabling compensation for expansion and contraction of the plate stack. Highly automated methods are available including electrically powered hydraulic systems. In the automatic designs, simplified control panels provide easy operation with minimal operator training.



Top: Electric/Oil Hydraulic Closing System

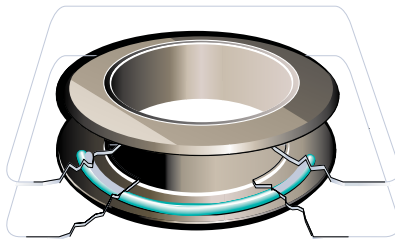
Left: Air/Oil Hydraulic Pumping Unit

Bottom: Pre-mounted, plumbed, wired and tested hydraulic control manifold

# Features, options and service

## Features, options and service

Not all aspects of Shriver® Filter Presses can be adequately depicted in a single brochure, nor can all performance and sizing data be tabulated. However, to present some approximation of the capability of FLSmidth's Shriver presses, information has been compiled and listed on the following page. Please do not use this data for construction purposes, it is only intended for estimating. Contact your local Shriver filter press representative at an FLSmidth office near you. You will be provided with the exact data that you require from your specifications. An array of options are available to tailor a filter press to your needs. To find a representative near you please go to [www.flsmidth.com](http://www.flsmidth.com).



FLSmidth's Flowing Weld Feed Eye Technology



Process control manifolds for manual or automated slurry feed, filtrate discharge, cake washing (when required) and air blow down



Automatic plate washer on overhead beam filter

## Optional additions

- **Wide selection of filter media**
- **Manual or automatic drip trays**
- **Cake dumpsters of drum discharge**
- **Filtrate blowdown system**
- **Core blowback system**
- **Cloth washers**
- **Automated control**
- **Cake discharge-assist mechanisms**
- **Alternative plate materials**
- **7 bar (100psi) & 16 bar (225 psi) designs**
- **High temperature polypropylene plates, alternative materials available for higher temperatures**
- **Construction, higher temperatures with alternate materials**
- **Air or electrically powered**
- **Cake washing or airblow**
- **Feed pump combinations**
- **Safety features (lanyards, light curtains, etc.)**

Typical Maximum Cake Volume		Number of Chambers										
		Sidebar Designs								Overhead Designs		
m <sup>3</sup>	ft <sup>3</sup>	M470	M630	M800	M900	M1000	M1200	M1500	M2000	M1500X1500	M1500X2000	M2000X2000
0.03	1.0	6										
0.05	1.6	10										
0.06	2.6	16										
0.09	3.2	20										
0.08	2.9		10									
0.11	4.1		14									
0.16	5.8		20									
0.2	7.0		24									
0.28	10.0			20								
0.42	15.0			30								
0.57	20.0			40								
0.35	12.2				20							
0.52	18.3				30							
0.69	24.4				40							
0.94	33.2					40						
1.41	49.8					60						
2.23	78.6						60					
2.97	100.8						100					
6.61	198.0							100		100		
7.29	257.4							130		130		
8.77	310.0										120	
11.7	412.0										160	
9.94	350.9								120			120
13.2	468.0								160			160
Volume per Chamber* (M <sup>3</sup> / Ft <sup>3</sup> )		.004 / 0.16	.027 / 0.29	.046 / 0.5	.017 / 0.61	.02 / 0.83	.04 / 1.31	.06 / 2.0	.08 / 2.9	.06 / 2.0	.07 / 2.6	.08 / 2.9
Filter Area per Chamber* (M <sup>2</sup> / Ft <sup>2</sup> )		.32 / 3.5	.59 / 6.37	.98 / 10.65	1.2 / 13.18	1.6 / 17.27	2.5 / 26.7	3.8 / 40.46	6.7 / 72	3.8 / 40.46	4.9 / 53	6.7 / 72
Nominal Plate Dimensions (mm / inches)		470 / 18.5	630 / 24.8	800 / 31.5	915 / 36	1000 / 39	1200 / 48	1500 / 59	2000 / 79	1500 / 59	1500 X 2000 59 x 79	2000 / 79

\* Nominal filtration areas and volumes are stated and will vary depending on selected cake thickness & final plate specifications for the application.

$$\text{Filter Press Volume (Cubic Feet)} = \frac{\text{Total Feed Volume (GAL)} \times \text{Solids Conc. (WT\%)} \times \text{Slurry S.G.} \times 8.34}{\text{Density of Wet Cake (LB/FT}^3\text{)} \times \text{Cake Solids Conc. (WT\%)}$$

$$\text{Filter Press Volume (Cubic Meters)} = \frac{\text{Total Feed Volume (Cubic Meters)} \times \text{Solids Conc. (WT\%)} \times \text{Slurry SG}}{\text{Density of Wet Cake (MT/CuM)} \times \text{Cake Solids Conc (WT\%)}$$

Chart above assumes 1.25" filter cake thickness in recessed plates. Other volume can be approximated by multiplying by cake thickness ratio. Consult Shriver® Filter Press Sales Representative for accurate sizing or for dimensions on other plate styles. For filtration applications where the feed concentration is less than 1 WT%, filter area may control sizing.

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### Mineral Processing Technology Center

FLSmidth Salt Lake City, Inc.  
7158 S. FLSmidth Drive  
Midvale, UT 84047-5559  
Tel: +1 801 871 7000  
Fax: +1 801 871 7001  
info.sl.c@flsmidth.com

### Eastern Australia Regional Office

FLSmidth Pty Limited  
5 Comserv Close  
West Gosford NSW 2250  
Australia  
Tel: +61 2 4320 4700  
info.australia@flsmidth.com

### Western Australia Regional Office

FLSmidth Pty Limited  
58-60 Dowd Street  
Welshpool WA 6106  
Australia  
Tel: +61 8 6258 4800  
info.australia@flsmidth.com

