

# FILTER PRESS

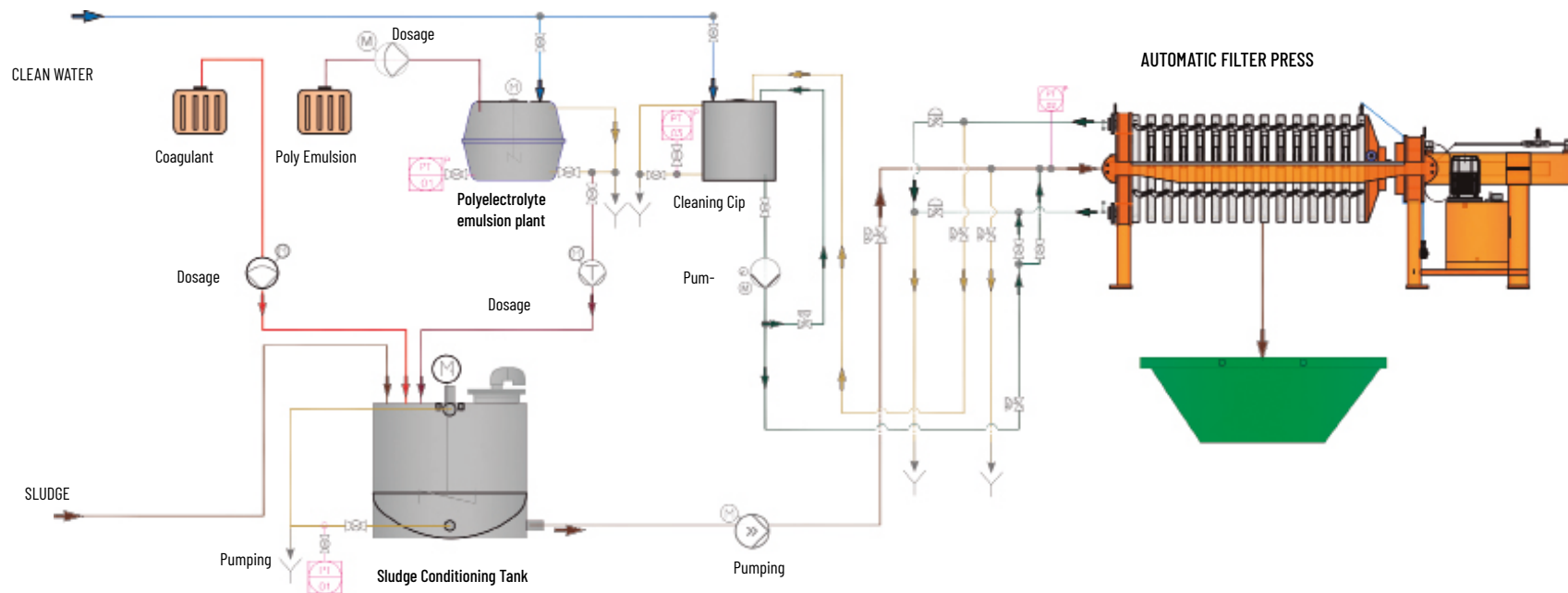
 draco®



SLUDGE  
DEWATERING



# Process Description



**The filtration cycle shall start with the filter press closed.**

- 1. FILTER PRESS CLOSURE:** The start of the filtering cycle begins with the closing of the filter press. The moving plate is activated by the hydraulic system and moves, closing the filter at the required working pressure, which is controlled by a pressure switch located in the hydraulic circuit.
- 2. FILLED:** Pumping of sludge into the filter press begins. The chambers fill with sludge and the formation of cakes begins. The solid particles are trapped on the surface of the cloths, while the liquid passes through them and is evacuated through the drainage system of the filter plates. The initial filtration pressure is minimal and increases as the number of particles retained increases.
- 3. FILTRATION:** The maximum filtration pressure is reached and maintained until the sludge pump is stopped. During the initial draining time, the appropriate level of cake dewatering is achieved. The compressed air valve is then opened to clean the central duct and remove the remaining sludge.
- 4. FILTER PRESS OPENING AND CAKE DISCHARGE:** After the final draining, the filter pack is opened. The formed cakes fall out as the plates separate. Once the filter is completely open, the shaker is started, which helps to completely discharge the cakes.



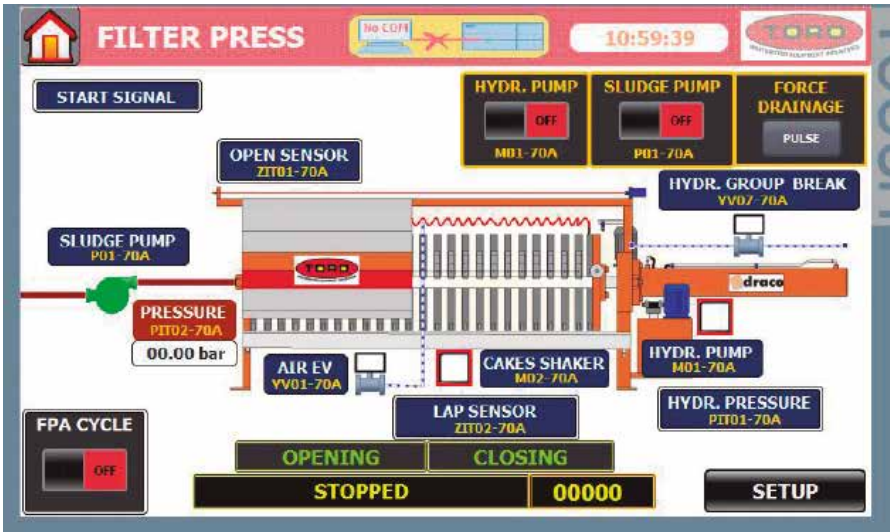
# STAGES OF THE CYCLE | PRESSING

- 1 Filter press closure
- 2 Filled
- 3 Filtration
- 4 Cake opening and unloading

## Pressing cycle time

In each process, the duration of the pressing cycle will depend on several factors, mainly on the type of sludge.

A sludge composed mostly of inert solids (cement works, quarries, marble works, etc.) has much shorter cycle times than those required for pressing a biological sludge.

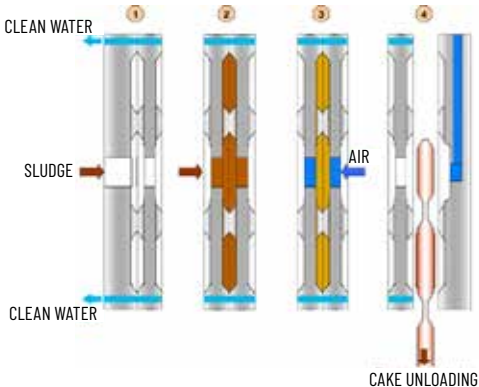
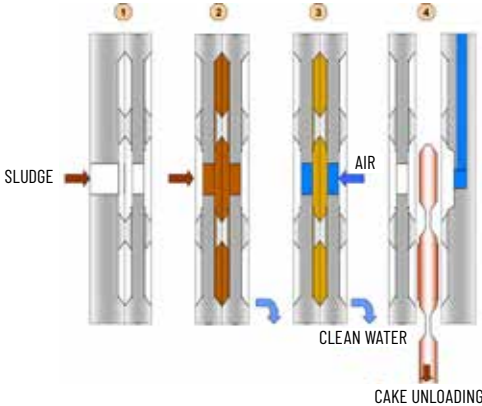


## OPEN EXECUTION

- Override option with the installation of different taps.
- Allows easy inspection of the quality of the filtered liquid.
- Allows quick location of damaged/broken fabric.

## CLOSED EXECUTION

- Suitable for preventing the drained water from coming into contact with the outside to protect it from contamination.
- Ideal for working with hazardous products.
- It also allows the cleaning of fabrics and the blowing of cakes.





# Complements

Compact assembly of the Draco® Filter Press, assembled in a 20'DV or 40'HC container depending on the size of the equipment it contains.

## ADVANTAGES | PRE-ASSEMBLED DRACO

- Quick installation.
- Ease of transport.
- Small footprint.
- Minimal visual impact.

Contained in:

- 20" containers.
- 40" containers.
- Isothermal containers.

## EQUIPMENT Draco® PILOT

Toro Equipment manufactures a small size Draco® Filter Press. This filter is generally demanded to meet specific needs, to carry out tests and studies.



## SLUDGE CONDITIONING

- Automatic polyelectrolyte plant
- Sludge conditioning tank
- Flocculator
- Soda dosing machine
- Polyelectrolyte dispenser
- Firefighter sludge to filter press

# Advantages and Applications



## FILTER CLOTHS AND FILTER PLATES

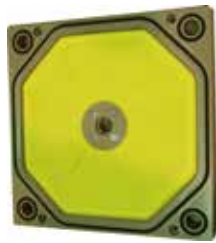
**Filter cloths and filter plates:** In order to obtain the maximum performance of the equipment, each Filter Press incorporates the most suitable filter cloth for each specific application.

### Types of fabrics:

- Standard fabrics.
- Fabrics with anti-drip frame.
- Fabrics for watertight plates.
- Special fabrics for the treatment of aggregates.
- Fabrics for other specific treatments.



Special fabrics for aggregate treatment



Fabrics for watertight plate



Non-drip cloth

### WASTE WATER

- Draco® Filter Presses achieve greater dryness, reducing the cost of managing the sludge generated.
- Easily transportable sludge. Problems such as liquid overflow in the containers are avoided.
- Sludge can be stacked once dewatered. The high degree of dryness facilitates sludge management, composting and logistics.
- Total reliability 24 hours a day. Unattended operation thanks to the cake shaking system.
- Low process water consumption.
- Minimal maintenance costs.
- No need for greasing.
- 100% automated cycle operation.
- Precise control of actual sludge production.
- Fairings that favour more hygienic atmospheres than rotating systems.
- The sludge only comes into contact with the air at the moment of opening.
- Possibility of filtering the sludge directly from the biological reactor without thickeners.

### WASTEWATER FOR REUSE

- Filtration below 10  $\mu$ .
- Guaranteed flow rate in cycles longer than 24 hours.
- Low investment and high reliability.

### STONE, AGGREGATES, TUNNEL BORING MACHINES

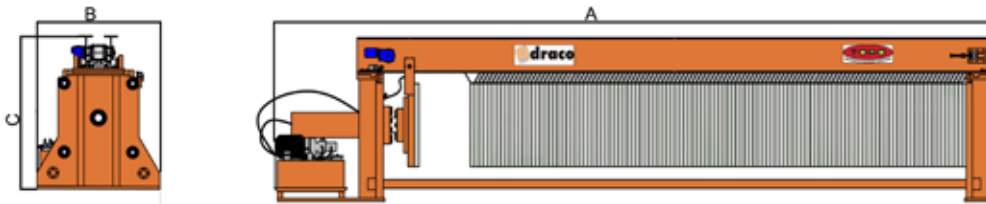
- High drainage capacity filter press.
- Fast cycles.
- Robust operation.

### ANTIBIOTICS, FOOD, BEVERAGES, CHEMICALS, CHEMICALS

- Closed design. The material does not come into contact with the chassis.
- Chassis in stainless steel or GRP infused in isophthalic resin or vinylester with high structural and corrosion resistance.
- Special filter plates.

# High performance

## FILTER PRESS WITH UPPER DRAG

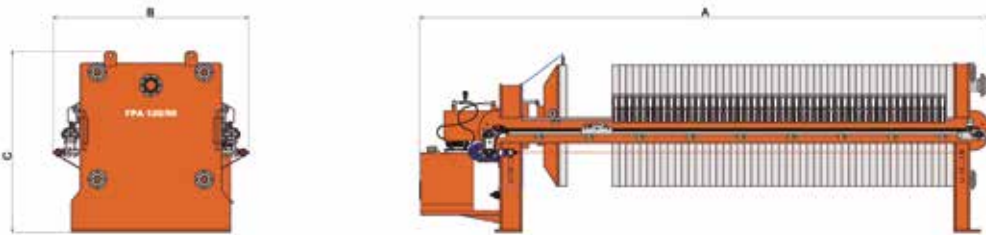


MODEL	Maximum number of plates	Length maximum	Width maximum	Height maximum	Maximum surface area filtering surface	Volume maximum filtering
		mm (A)	mm (B)	mm (C)	(m <sup>2</sup> )	(l)
<b>FPA-AR 1000</b>	125	11.000	1.400	2.100	215	3.220
Pump type: 23 cm <sup>3</sup> cylinders		Tank volume (l): 150		Power: 7,5 Kw		
<b>FPA-AR 1200</b>	125	12.400	1.900	2.400	310	4.445
Pump type: 23 cm <sup>3</sup> cylinders		Tank volume (l): 150		Power: 7,5 Kw		

Frame: Material ST-37/AISI-304, Finish: Epoxy paint.  
 Drive: Automatic.  
 Ral 2011

\*Ask for capacities with different number of plates.

## SIDE-DRAG AUTOMATIC FILTER PRESS



MODEL	No. of plates	No. of cameras	Length	Width	Height	Unladen weight	Loaded weight	Total filter area	Cake volume total PF	Size plates and fabrics
	ud.	ud.	mm (A)	mm (B)	mm (C)	(Kg)	(Kg)	(m <sup>2</sup> )	(l)	mm
<b>FPA AL</b>	40	39	5.020	1.935	1.790	7.800	9.420	92	1.247	1.200
<b>FPA AL</b>	50	49	5.710	1.935	1.790	8.400	10.438	115,60	1.567	1.200
<b>FPA AL</b>	60	59	6.400	1.935	1.790	9.000	11.450	139,2	1.886	1.200

Pump type: 25 cm<sup>3</sup> cylinders      Tank volume (l): 100      Power: 4Kw

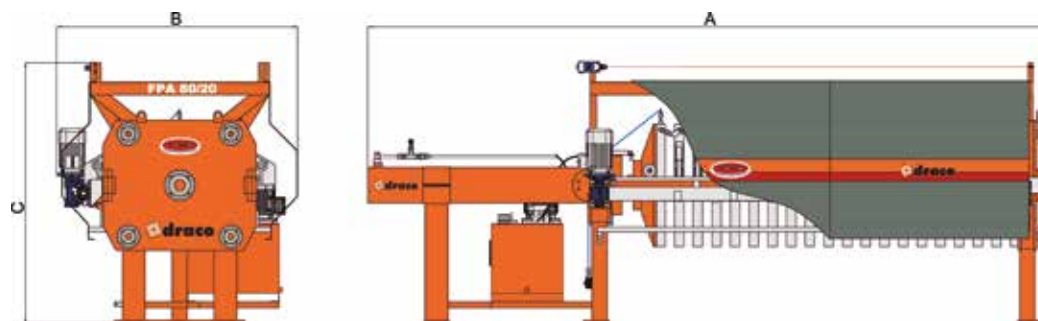
Frame: Material ST-37/AISI-304, Finish: Epoxy paint.  
 Drive: Automatic.  
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# Technical Specifications

MODEL	No. of plates	No. of cameras	Length	Width	Height	Unladen weight	Loaded weight	Total filter area	Cake volume total PF	Size plates and fabrics
	ud.	ud.	mm (A)	mm (B)	mm (C)	(Kg)	(Kg)	(m <sup>2</sup> )	(l)	mm
FPA 47/	5	4	1.455	1.167	1.396	660	688	1,5	21	470
	10	9	2.330	1.167	1.396	800	860	3,3	47	470
	15	14	3.170	1.167	1.396	940	1.035	5,2	73	470
	20	19	4.030	1.167	1.396	1.100	1.230	7,0	98	470
	25	24	4.910	1.167	1.396	1.260	1.420	8,9	124	470
	30	29	5.775	1.167	1.396	1.410	1.605	10,7	150	470
Pump flow rate (l/m): 6,8			Tank volume (l): 30		Power: 3 Kw		Calculated for a cake thickness of: 32 mm			
FPA 63/	10	9	2.415	1.350	1.508	1.380	1.490	5,9	85	630
	15	14	3.270	1.350	1.508	1.500	1.670	9,1	132	630
	20	19	4.145	1.350	1.508	1.620	1.850	12,4	179	630
	25	24	5.030	1.350	1.508	1.780	2.080	15,6	226	630
	30	29	6.200	1.350	1.508	1.900	2.250	18,9	273	630
Pump flow rate (l/m): 12+4			Tank volume (l): 55		Power: 2,2 Kw		Calculated for a cake thickness of: 32 mm			
FPA 80/	15	14	3.565	1.585	1.700	2.500	2.790	15,3	224	800
	20	19	4.475	1.585	1.700	2.730	3.125	20,7	305	800
	25	24	5.535	1.585	1.700	2.970	3.470	26,2	385	800
	30	29	6.295	1.585	1.700	3.100	705	31,6	465	800
CPump flow rate (l/m): 28+4,5			Tank volume (l): 75		Power: 4 Kw		Calculated for a cake thickness of: 32 mm			
FPA 100/	20	19	5.165	1.780	1.950	6.000	6.630	33	485	1.000
	25	24	5.485	1.780	1.950	6.400	7.195	42	612	1.000
	30	29	5.805	1.780	1.950	6.800	7.762	50,8	740	1.000
Pump flow rate (l/m): 33+5			Tank volume (l): 100		Power: 4 Kw		Calculated for a cake thickness of: 32 mm			
FPA 120/	20	19	5.380	2.010	2.135	6.550	7.375	48	635	1.200
	25	24	5.725	2.010	2.135	7.200	8.240	61	802	1.200
	30	29	6.070	2.010	2.135	7.850	9.110	73	969	1.200
	35	34	6.415	2.010	2.135	8.500	9.977	86	1.136	1.200
Pump flow rate (l/m): 33+5			Tank volume (l): 100		Power: 4 Kw		Calculated for a cake thickness of: 32 mm			
FPA 150/	20	19	5.156	2.300	1.800	7.150	8.505	73,9	1.042	1.500
	25	24	6.141	2.300	1.800	7.800	9.512	93,4	1.317	1.500
	30	29	7.126	2.300	1.800	8.450	10.519	112,8	1.591	1.500
	35	34	8.011	2.300	1.800	9.100	11.525	132,3	1.865	1.500
Pump flow rate (l/m): 33+5			Tank volume (l): 150		Power: 4 Kw		Calculated for a cake thickness of: 32 mm			

Frame: Material ST-37/AISI-304, Finish: Epoxy paint.  
 Model FPA 47 lateral axles in GRP. Drive: Automatic.  
 Working pressure: 8 Bars.  
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## AUTOMATIC FILTER PRESS

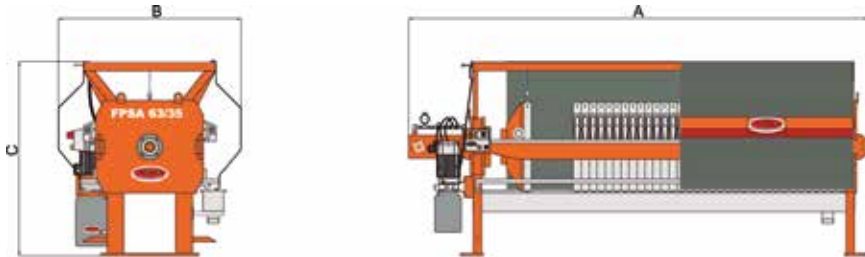


### NOTE:

- (1) The FPA is supplied with:
  - GRP side guards.
  - Filtered water collection channel and handles.
  - Pressurised air connection.
  - Equipped with cake blowing circuit.
  - Emergency stop by cable.
  - Hydraulic oil included.
- (2) Compressor not included.
- (3) Dimensions and technical specifications may vary slightly due to the normal development of the products by the technical team or Toro Equipment S.L., technical team or Toro Equipment S.L. When placing your order, please ask for specifications drawing at [www.toroequipment.com](http://www.toroequipment.com)

# Technical Specifications

## SEMI-AUTOMATIC FILTER PRESS



### NOTE:

- (1) The FPSA is supplied with:
- GRP side guards.
  - Filtered water collection channel and handles.
  - Pressurised air connection.
  - Equipped with cake blowing circuit.
  - Hydraulic oil included.
- (2) Compressor not included.
- (3) Dimensions and technical specifications may vary slightly due to the normal development of the products by the technical team or Toro Equipment S.L. When placing your order, please request specification drawing at [www.toroequipment.com](http://www.toroequipment.com).

MODEL	No. of plates	No. of cameras	Length	Width	Height	Unladen weight	Loaded weight	Total filter area	Cake volume total PF	Size plates and fabrics
	ud.	ud.	mm (A)	mm (B)	mm (C)	(Kg)	(Kg)	(m <sup>2</sup> )	(l)	mm
FPSA 47/	5	4	1.495	1.100	1.270	580	610	1,5	21	470
	10	9	1.765	1.100	1.270	620	680	3,3	47	470
	15	14	2.035	1.100	1.270	660	755	5,2	73	470
	20	19	2.305	1.100	1.270	710	837	7	98	470
	25	24	2.575	1.100	1.270	760	920	8,9	124	470
	30	29	2.845	1.100	1.270	810	1005	10,7	150	470
	35	34	3.115	1.100	1.270	860	1089	12,5	176	470
	40	39	3.385	1.100	1.270	910	1172	14,4	202	470
	45	44	3.655	1.100	1.270	960	1256	16,3	228	470
	50	49	3.925	1.100	1.270	1.010	1340	18	254	470
	55	54	4.195	1.100	1.270	1.060	1425	20	280	470
	60	59	4.465	1.100	1.270	1.110	1507	21,8	306	470
Pump flow rate (l/m): 2,5 Tank volume (l): 8 Calculated for a cake thickness of: 32 mm										
FPSA 63/	10	9	1.865	1.308	1.385	1.050	1.160	5,9	85	630
	15	14	2.150	1.308	1.385	1.115	1.285	9,1	132	630
	20	19	2.435	1.308	1.385	1.200	1.430	12,4	179	630
	25	24	2.720	1.308	1.385	1.270	1.565	15,6	226	630
	30	29	3.005	1.308	1.385	1.350	1.705	18,9	273	630
	35	34	3.290	1.308	1.385	1.420	1.837	22,1	321	630
	40	39	3.575	1.308	1.385	1.490	1.968	25,4	368	630
	45	44	3.860	1.308	1.385	1.560	2.100	28,6	415	630
	50	49	4.145	1.308	1.385	1.630	2.230	31,9	462	630
	55	54	4.430	1.308	1.385	1.700	2.360	35,1	509	630
60	59	4.715	1.308	1.385	1.770	2.490	38,4	556	630	
Pump flow rate (l/m): 2,5 Tank volume (l): 8 Calculated for a cake thickness of: 32 mm										
FPSA 80/	15	14	2.410	1.585	1.575	1.910	2.200	15,3	224	800
	20	19	2.720	1.585	1.575	2.080	2.475	20,7	305	800
	35	34	3.750	1.585	1.575	2.250	2.750	26,2	385	800
	30	29	3.340	1.585	1.575	2.420	3.025	31,6	465	800
	35	34	3.750	1.585	1.575	2.590	3.300	37,1	545	800
	40	39	4.060	1.585	1.575	2.760	3.572	42,5	625	800
	45	44	4.370	1.585	1.575	2.930	3.846	48,0	705	800
	50	49	4.680	1.585	1.575	3.100	4.120	53,4	785	800
	55	54	4.990	1.585	1.575	3.270	4.395	58,4	866	800
	60	59	5.300	1.585	1.575	3.440	4.670	64,3	946	800
Pump flow rate (l/m): 7,2 Tank volume (l): 15 Calculated for a cake thickness of: 32 mm										

Frame: Material ST-37/AISI-304, Finish: Epoxy paint.  
 Model FPSA and FPM 47 lateral shafts in GRP Actuator: Joystick  
 Working pressure: 8 Bars.  
 Ral 2011.



# Technical Specifications

MODEL	No. of plates	No. of cameras	Length	Width	Height	Unladen weight	Loaded weight	Total filter area	Cake volume total PF	Size plates and fabrics
	ud.	ud.	mm (A)	mm (B)	mm (C)	(Kg)	(Kg)	(m <sup>2</sup> )	(l)	mm
FPM 47/	5	4	1.495	1.100	1.270	580	610	1,5	21	470
	10	9	1.765	1.100	1.270	620	680	3,3	47	470
	15	14	2.035	1.100	1.270	660	755	5,2	73	470
	20	19	2.305	1.100	1.270	710	837	7,0	98	470
	25	24	2.575	1.100	1.270	760	920	8,9	124	470
	30	29	2.845	1.100	1.270	810	1.005	10,7	150	470
	35	34	3.115	1.100	1.270	860	1.089	12,5	176	470
	40	39	3.385	1.100	1.270	910	1.172	14,4	202	470
	45	44	3.655	1.100	1.270	960	1.256	16,3	228	470
	50	49	3.925	1.100	1.270	1.010	1.340	18	254	470
55	54	4.195	1.100	1.270	1.060	1.425	20	280	470	
60	59	4.465	1.100	1.270	1.110	1.507	21,8	306	470	

Pump flow rate (cm<sup>3</sup>/cycle): 25 Tank volume (l): 10 Calculated for a cake thickness of: 32 mm

FPM 63/	10	9	1.865	1.308	1.385	1.050	1.160	5,9	85	630
	15	14	2.150	1.308	1.385	1.115	1.285	9,1	132	630
	20	19	2.435	1.308	1.385	1.200	1.430	12,4	179	630
	25	24	2.720	1.308	1.385	1.270	1.565	15,6	226	630
	30	29	3.005	1.308	1.385	1.350	1.705	18,9	273	630
	35	34	3.290	1.308	1.385	1.420	1.837	22,1	321	630
	40	39	3.575	1.308	1.385	1.490	1.968	25,4	368	630
	45	44	3.860	1.308	1.385	1.560	2.100	28,6	415	630
	50	49	4.145	1.308	1.385	1.630	2.230	31,9	462	630
	55	54	4.430	1.308	1.385	1.700	2.360	35,1	509	630
60	59	4.715	1.308	1.385	1.770	2.490	38,4	556	630	

Pump flow rate (cm<sup>3</sup>/cycle): 25 Tank volume (l): 10 Calculated for a cake thickness of: 32 mm

FPM 80/	15	14	2.410	1.585	1.575	1.910	2.200	15,3	224	800
	20	19	2.720	1.585	1.575	2.080	2.475	20,7	305	800
	25	24	3.030	1.585	1.575	2.250	2.750	26,2	385	800
	30	29	3.340	1.585	1.575	2.420	3.025	31,6	465	800
	35	34	3.650	1.585	1.575	2.590	3.300	37,1	545	800
	40	39	3.960	1.585	1.575	2.760	3.572	42,5	625	800
	45	44	4.270	1.585	1.575	2.930	3.846	48,0	705	800
	50	49	4.580	1.585	1.575	3.100	4.120	53,4	785	800
	55	54	4.890	1.585	1.575	3.270	4.395	58,8	866	800
	60	59	5.200	1.585	1.575	3.440	4.670	64,3	946	800

Pump flow rate (l/m): 28+4,5 Tank volume (l): 75 Power: 4 Kw Calculated for a cake thickness of: 32 mm

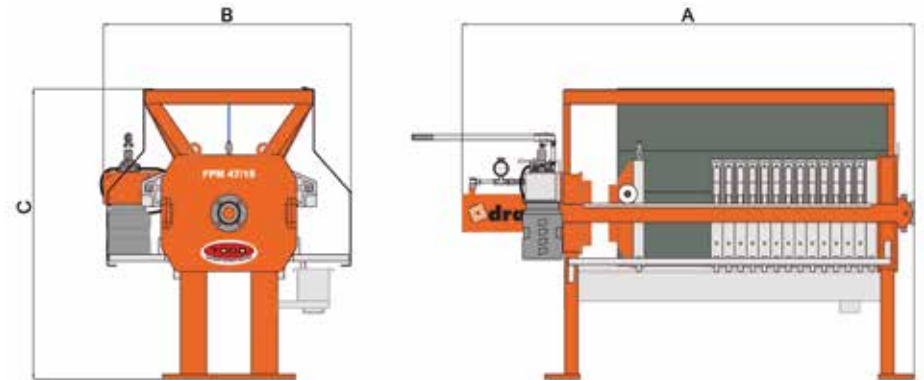
Frame: Material ST-37/AISI-304, Finish: Epoxy paint.

Actuator: Automatic.

Working pressure: 8 Bars.

Ral 2011.

## MANUAL FILTER PRESS



### NOTE:

- (1) The FPA is supplied with:
  - GRP side guards.
  - Filtered water collection channel and handles.
  - Pressurised air connection.
  - Equipped with cake blowing circuit.
  - Emergency stop by cable.
  - Hydraulic oil included.
- (2) Compressor not included.
- (3) Dimensions and technical specifications may vary slightly due to the normal development of the products by the technical team or Toro Equipment S.L.. technical team or Toro Equipment S.L.. When placing your order, please ask for specifications drawing at [www.toroequipment.com](http://www.toroequipment.com)

# Optional

## EQUIPMENT

● Standard equipment ● Optional equipment

BODY	FPA	PFSA	FPM
S235JR Material	●	●	●
ISO/ANSI connecting flanges	●	●	●
GRP Protective covers	●	●	●
Lifting eye bolts	●	●	●
Anchor support	●	●	●
RAL 2011 paint	●	●	●
Clean water collection spillway	●	●	●
Pressure air connection	●	●	●
DOCUMENTATION	FPA	PFSA	FPM
Operating manual in specific language	●	●	●
Identification plate	●	●	●
Documentation in ISO regulations	●	●	●
CERTIFICATES	FPA	PFSA	FPM
CE certificate	●	●	●
Factory test certificate	●	●	●
Quality certificate	●	●	●
Sealing certificate	●	●	●
Certificate of materials	●	●	●
Welding certification	●	●	●
Hydraulic group certificate	●	●	●

● Standard equipment ● Optional equipment

DISTRIBUION PANEL	FPA	PFSA	FPM
Distribution panel	●	●	—
Control screen 6"	●	—	—
Emergency stop	●	—	—
Piston proximity sensor	●	—	—
ACTIVATION	FPA	PFSA	FPM
Multi-voltage motor	●	●	—
ATEX motor	●	●	—
NEMA, CSA,...motor	●	●	—
OTHERS	FPA	PFSA	FPM
Stainless steel, polypropylene and PVC	●	●	●
Conveyor belt	●	●	—
Sludge conditioning tank TAF	●	●	●
Lime hopper TDC	●	●	●
Drip tray	●	—	—
Cake shaker	●	—	—
PACKAGINS	FPA	PFSA	FPM
Packaging	●	●	●
Packed in a wooden crate	●	●	●
Lifting structure	●	●	●
Containerisation	●	●	●

● Distribution panel



● Manifold in PVC



● Scada



● FPA 120/115 Mobil filter press



● Packed in a wooden crate



## HOW TO DETERMINE THE SIZE OF THE FILTER PRESS YOU NEED?

### Design details:

- Sludge volume per day.
- Kg of dry matter.
- No. of working hours per day.



The following is an example of pressing without lime, knowing that the dryness we are going to obtain is 30%.

**Input data: sludge volume of 7m<sup>3</sup>/day, at 6% dryness**

In order to obtain the kg of dry matter, we have to multiply the volume by the dryness. The result is **420 kg of dry matter**. The dryness of the cake at the exit will be 30%.

Therefore we will have 1.4 m<sup>3</sup>/day of cakes at 30% = 1,400 l/day.

If we want to carry out 4 pressing cycles per day 1.400/4= 355 l/cycle (we look for this data in the table).

**In this case, the Filter Press to be selected would be an FPA 80/25.**

MODEL	No. of plates	Nº of cameras	Length mm	Width mm	Height mm	Unladen weight (Kg)	Loaded weight (Kg)	Total filtering surface (m <sup>2</sup> )		Cake volume total FP (l)		Plate and fabric sizes (mm)
								Ex. open	Ex. closed	Ex. open	Ex. closed	
FPA 80/	15	14	3.565	1.585	1.700	2.500	2.790	15,3	14,1	224	202	800
	20	19	4.475	1.585	1.700	2.730	3.125	20,7	19,2	305	274	800
	25	24	5.535	1.585	1.700	2.970	3.470	26,2	24,2	385	346	800
	30	29	6.295	1.585	1.700	3.100	705	31,6	29,3	465	418	800

Double pump flow rate (l/m): 12+4 Tank volume (l): 58 Power: 2.2 Kw Calculated for a cake thickness of: 32 mm





Factory Villavaquerín - Valladolid

## WORLD REFERENCES

- Algeria
- Argentina
- Australia
- Austria
- Belgium
- Brazil
- Bulgaria
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Croatia
- Dominican Republic
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**FOUNDED**  
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+34 983 403 047  
toro@toroequipment.com  
toroequipment.com

### FACTORY

Ctra. Nacional VP-3302, km 11  
47329 Villavaquerín  
Valladolid (Spain)

### FACTORY AND OFFICES

C/ Ronda del Sauce 34  
47193 La Cistérniga  
Valladolid (Spain)



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