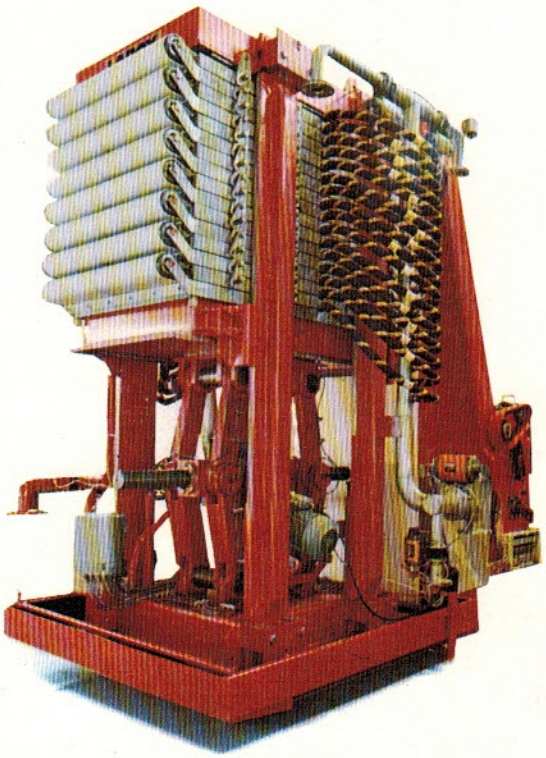
AUTOMATIC PRESSURE FILTER



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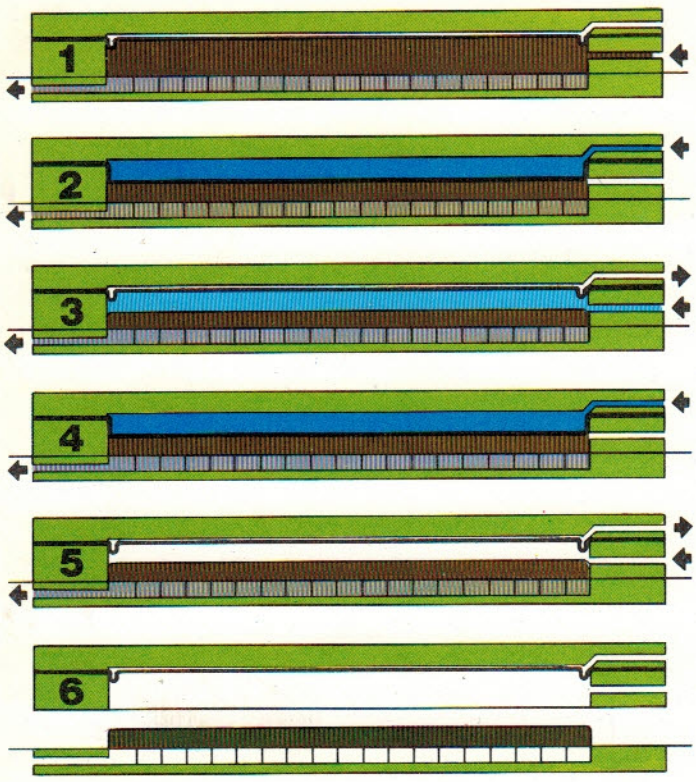
OPERATION



The clamping device presses the horizontal filter units until a pre-set specific sealing pressure is reached.

1 Filtration. The slurry inlet valve opens and the slurry pump starts up. All the chambers are fed simultaneously from the distributing duct and filled in less than one minute.
The liquid phase of the slurry is forced through the filter cloth into the filtrate trough, from which it drains through the vertical discharge duct and a controlled reversing valve to the filtrate flow-off.
A timer stops the filtration by closing the slurry inlet valve.

2 Diaphragm pressing I. Pressure water is applied to the diaphragms and the residual moisture is reduced by the compression of the cakes. When the time for compressing the cakes is over, the pressure is released and the pressure wa discharge opens.

3 Cake washing. The washwater valve now opens and the cake is washed in accordance with the preselected programme.

4 Diaphragm pressing II. After washing, the pressure water valve opens again and the diaphragm presses the cake dry.

5 Cake air blow. To complete the dewatering, the pressure air valve opens and the air flows through the cake. The cake washing, diaphragm pressing and air blowing may be done as often as necessary.

6 Cake discharge. After the cake drying the automatic pressure filter opens. Due to the pick-up links, the clearance between each filter unit is the same.

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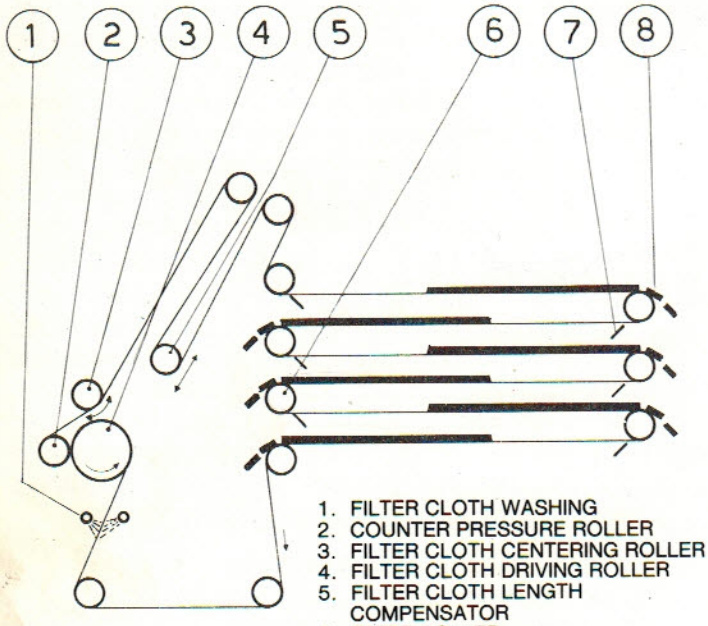
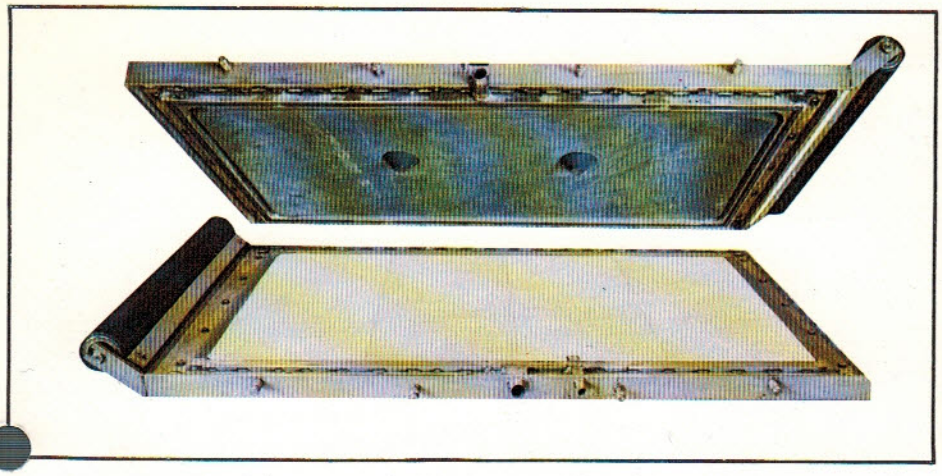
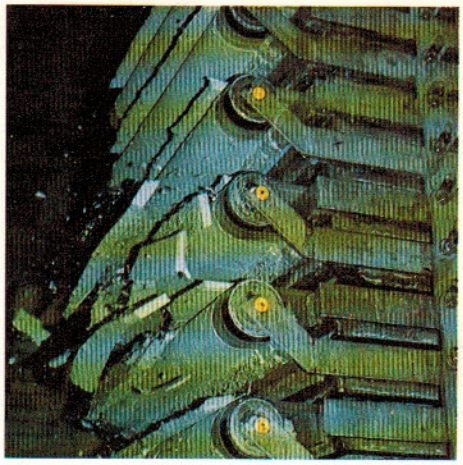


1. FILTER CLOTH WASHING
2. COUNTER PRESSURE ROLLER
3. FILTER CLOTH CENTERING ROLLER
4. FILTER CLOTH DRIVING ROLLER
5. FILTER CLOTH LENGTH COMPENSATOR
6. GUIDE ROLLER
7. CAKE SCRAPER
8. FILTER CAKE

As soon as the pressure filter is open, the filter cloth drive goes into operation. The filter cakes come out from the right and left sides of the machine. As the filter cloth passes the rollers, t cakes disengage from the cloth and broken pieces of convenient size fall down. Pieces of cake remaining on the cloth are scraped off.
The highest purity of filtrate is obtained by installing of additional stationary cloths of finer mesh.
The filter cloth washing equipment operates automatically during the run, when the filter cloth is cleaned on both sides by pressure water sprays. After passing the driving rollers, the cleaned cloth is brought to parallel by a centering roller. It enters the filter unit pack after passing the length compensator.

CONSTRUCTIONAL FEATURES





Type: PF		2,5	5,0	9,5	12,5	19,0	25,0	32,0
Filter area	m²	2,5	5,0	9,5	12,5	19,0	25,0	31,5
Plate clearance	mm	45	45	45	45	45	45	45
Max operating pressure	bar	16	16	16	16	16	16	16
Number of filter plates		6	12	6	8	12	16	20
Filter cloth dimensions	mm	650× 16500	650× 26500	1050× 25000	1050× 30000	1050× 40000	1050× 46500	1050× 53000
Installed power								
— Clamping mechanism	kW	3	3	7,5	7,5	7,5	7,5	7,5
— Cloth tensioning device	kW	0,75	0,75	1,1	1,1	1,1	1,1	1,1
— Cloth moving mechanism	kW	1,5	1,5	4	4	4	4	4
— Water pump	kW	4	4	7,5	7,5	7,5	7,5	7,5
Overall dimensions								
— length	mm	2550	2850	4000	4000	4000	4000	4000
— width	mm	1300	1300	2000	2000	2000	2000	2000
— height	mm	2350	3065	2565	2800	3275	3750	4350
Total floor space requirements	m²	16	16	30	30	30	30	30
Weight, tons								
— filter proper	t	4,8	6,5	10,3	11,1	12,6	14,0	15,7
— filter with auxialiries	t	6,3	8,0	12,6	13,4	14,9	16,3	18,0

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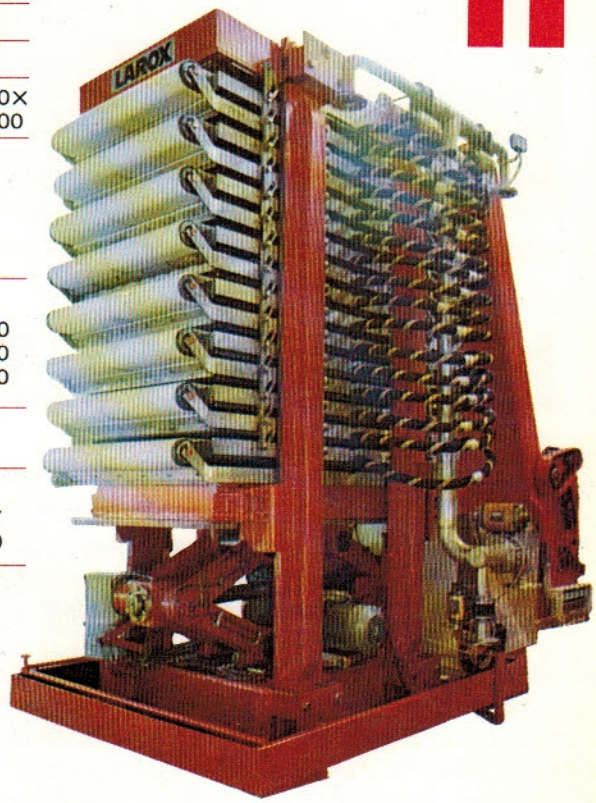

A single filter unit, forming a filter chamber, consists of the plate, frame, collector sections, diaphragm, supporting grid and perforated sheet.

A diaphragm fixed in the frame and lies on the cloth. Pressure can be applied to the back of the diaphragm, when the bottom of the diaphragm forms the top and sides of the cake chamber. Each filter unit has a common connection for slurry, wash liquid and drying air, and a second piece of the same shape for filtrate discharge.

The filter cloth zigzags through the pack of filter units and after leaving the lowest enters a washing vat. The cloth is thoroughly cleaned in the washing vat by pressure liquid from spraynozzles.

A regulating roller in followed by a cloth length compensator covering approx. 10 % of the length.

The pressure medium, preferably water, is brought from a distributing pipe to the back of the diaphragm of each filter unit by means of connecting hoses.

The pressure filter is a fully automatic machine. It can also be run semi-automatically, i.e. after starting the closed machine the individual operations: "Filtration", "Compression I", "Washing", Compression II", "Drying", and "Discharge" are initiated by pressing the relevant push-button. Each operation stops on pressing the push-button for the next operation or for the full stop. It is possible to exclude one or more operations in the above-mentioned sequence.

The filter is made in three standard executions:

1. **Stainless steel construction for non-corrosive applications,**
2. **stainless steel construction for corrosive applications and**
3. **acid proof construction for extra heavy corrosive applications.**

ADVANTAGES

The Larox Automatic Pressure Filter increases output some four to ten fold in comparison with the plate-and-frame presses, sharply cuts expenditure on filter cloth and makes the process of filtration fully automatic. One operator can run up to ten pressure filters.

— greater filtering area for a relatively small floor space;
— filtration and cake drying at a pressure of up to 15 bars at optimum cake thickness;
— filter cakes are dried by hydraulic pressure exerted over rubber diaphragms, thus considerably saving the compressed air required for drying;
— auxiliary operations take little time (filter opening, cake discharge, and closing take 1—5 minutes altogether);
— efficient cleaning of filter cloth in the course of operation;
— efficient cleaning of filter cloth in the course of operation;
— efficient and economical wash of filter cakes, due to the diaphragm assembly and horizontal position of the plates;
— fully automatic operation, allowing rapid adjustment of the filter for the maximum efficiency of the process;
— automatic discharge of filter cakes;
— weight of filter, in relation to the weight of filtered product, is 2—3 times less than in the present plate-and-frame presses.

PERFORMANCE DATA

The automatic pressure filter is already running successfully in a large number of industries, e.g. the ceramics, foodstuffs, dyestuff, chemical and mining industries, as well as in steel works and waste water treatment plants.

The table lists the operational results achieved in these applications. The average values of operational filtration data obtained with the automatic pressure filter are compared with those obtained with other filtration equipment. If washing operations are necessary, they considerably affect the specific filter performance and the filtering area required. This means increased operational expenditure which, however, is at its lowest in the case of the automatic pressure filter because of the reduced washing time and better washing efficiency.

All data are applicable only under the same operating conditions as when they were obtained.

Field of application	LAROX-PF		OTHER FILTRATION EQUIPMENT		
Product and process	Capacity dry cake kg/m²h	Residual moisture % in cake	Filter type	Capacity dry cake kg/m²h	Residual moisture % in cake
Ceramics					
Kaolin	36—40	28—30	Chamber filter press	7—8	33—34
Talc	200—700	10—15	Plate and frame filter	8—12	20—22
Mining Industry					
Coal Sludges	80	20	,,	8—9	22—24
Aniline					
Scarlet Lake	1,3—1,5	62	,,	0,15	78
Dye-Stuff Industry					
Acid Orange	10—13	47—50	,,	0,685	52—54
Light-Fast Substantive Bordeaux	5—7	64—66	,,	0,7	70—72
Bright Green Neutral	1,7	76	,,	0,17	80
Light Green Acid	1	78	,,	0,24	80
Golden Yellow	7	65	,,	0,33	70—74
Dioxylactòn	5,5	42	,,	0,25	50—60
Bright Orange	17,2	62	,,	0,25	85
Light-Fast Acid Scarlet	1,7—2	50—52	,,	0,3	59
Food Industry					
Sugar Industry Juice	65—75	40—43	Vacuum drum filter	35—40	50—51
Hydro-Metallurgy					
Tungstic acid production					
first leaching	100	4—8	,,	10	20—21
second leaching	60—70	13—15	,,	6—7	25—30
Lime Suspension	120	44—46	,,	15	55—60
Magnesium Fluoride	50	35—37	,,	9—10	42—45
Gel, Polysilicic acids	3—18	45—55	,,	0,7—3	60—65
Molybdenum Trisulphide	5	55—60	,,	1,6—1,7	65—70
Zirconium Sulphate Solution	50—54	20—25	—		
Copper Cadmium Sludge	5—6 1,0—1,2 m³/m²h		Plate and frame filter	1,0—1,1 0,15—0,8 m³/m²h	—
Zinc Oxide	45	41	,,	6—8	50
Zinc Stearate	110	25—28	Centrifuge	50	34—35

Field of application Product and process	LAROX-PF Capacity dry cake kg/m²h	 Residual moisture % in cake	OTHER FILTRATION EQUIPMENT Filter type Filter type	 Capacity dry cake kg/m²h	 Residual moisture % in cake
Rare-Metals Separation in Zinc Production Arsenic Refining Solutions	65—70	40	—		
Solution for Selenic Cake Leaching	28—30	25—28	Plate and frame filter	8—10	30—35
Solutions for Sulphate Product Leaching	115—120	15	Vacuum Disc filter	16—18	26
Solution for Copper-Chlorine Cake Leaching	55—58	35	Plate and frame	4—5	40—45
Dust Catching Solution	25—30	25	Vacuum Disc filter	9—10	35
Calsium Arsenite Suspension	110—115	45	,,	10—11	50
Solution for Washing Selenium-Arsenic Cakes	25—30	43	,,	1,5—2	50
Aluminium Production Red Slurry from Washing Clarifiers	55—60	20—25	Kelly filters	15—18	45—50
Bariumsalt Production Water Leaching	70 0,6 m³/m²h filtrate	30—35	Plate and frame filter	5—6 0,04—0,05 m³/m²h filtrate	45—47
Acid Leaching	7—18 0,15 m³/m²h filtrate	60	Plate and frame filter	3—4 0,03—0,035 m³/m²h filtrate	65—70
Ferrous Metallurgy Silico Manganese	68	35	—	—	500—600 g/l concentration
Blast Furnaces	110—140	25—29	Sedimentation	—	500—600 g/l concentration
Siemens-Martin Steel Furnaces	25—30	18—20	Sedimentation	—	250—300 g/l concentration
Ferro-Alloy Furnaces	25—30	40—42	Sedimentation	—	90—120 g/l concentration
Neutralized Etching Effluent	3—4 0,24—0,32 m³/m²h filtrate	65—70	Sedimentation	—	12—15 g/l concentration
Fluorine Production Sodium Bifluoride	80—95	14—16	Centrifuges	40—50 kg/h	12—15
Synthetic Rubber Catalyst Masses	0,55 double slurried	69—70	Plate and frame	0,11 double slurried	72—75
Silica Gel Production Rubber Filling Material	6—8	67—72	Vacuum drum	4 triple slurried	79—82
Catalyst Carrier	4	75—77	—	—	
Ammonia White Soot	8—9	68—70	Belt filter	3—4 triple slurried	85
Municipal Sewage Sludge	14—17	42—56	Plate and frame filter	6—9	55—65

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Layout: Adforma Oy, Lahti
Bulletin 103 GB 08 78 Lahti Esan Kirjapaino Oy.
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