

鑽石牌

Diamond

壓濾機

Filter Press

真空乾燥型壓濾機

Vacuum Drying Filter Press

高效 High Efficiency

順暢 Running Smooth

耐操 Long Life



鑽石牌 環保設備生產行銷台灣及全世界已經超過 25 年，堅持正確的基礎科學理論所組成的研究開發團隊，加上完善的生產銷售服務組織，使鑽石牌成為同類產品的領導品牌。

從水處理使用之沉澱池刮泥機、加壓浮除機、污泥脫水機、污泥乾燥機等固液分離裝置到化工製程使用之澄清過濾機、篩分機、乾燥機等一系列相關設備，均能提供技術成熟、品質可靠之產品給各界使用。

研究發展：本公司多年來與國內知名學術研究機構合作多項計劃，研究範圍從固液分離基礎理論、污泥調理、助濾劑預敷、濾材選擇、過濾程序（恆速過濾、恆壓過濾）至化工熱力學等一系列研究題目，大幅提升機械功能及耐久性，進而跨入化工業製程領域。

製造組裝廠：以專業機械製造組裝工廠的營運策略，每一項零件均需通過製程中嚴格的多道檢驗；每一項產品均長時間不停機運轉正常才出廠，降低產品不良率維修機率，充分落實 ISO9002 品質管制程序。

Diamond brand environmental equipments be manufactured and sold in Taiwan and around the world for over 25 years, due to our dedicated and experienced R&D working team plus a well established after services networks, it makes Diamond brand's machine as a leading equipment of the same kinds of equipments.

Research and Development:

For years, we had jointed many R&D projects with local well known research institutes in the field of solid-liquid separation, sludge condition, filter aids precoating, filter media material selection, types of filtration (constant rate filtration, constant pressure filtration) and thermodynamic analysis.

We specialize machine-production to providing the best quality products to all customers, in order to comply with ISO9002 requirements, every parts and items have to be checked in process and the equipment has to go through long-time and continuously running test before its delivery!



科學原理：壓濾式脫水機主要功能是從液體中分離出固體物，是由機架、濾板、濾布和為自動化操作的多種模組化機件組合而成。當泥漿壓送接觸濾布時，較大顆粒在濾布孔洞前產生架橋過濾作用（因濾餅層才是過濾的主角，故稱 CAKE FILTRATION），固體物被攔截並堆積形成濾餅層，泥漿中穿過濾餅及濾布的液體被回收或排放謂之濾液；濾布和濾餅會產生阻抗，流體的壓力必需更高於逐漸增厚的濾餅層所增加的阻抗，直到壓濾機內的濾餅層達到結實的狀態，濾板將被拉開並卸下濾餅。

濾液須流經三種不同阻抗且總壓力落差 (-ΔP) 等於個別的和：

1. 管道阻抗：比較起另兩種微不足道。
2. 濾布阻抗：嶄新的與使用過的不同，每批次剛開始操作初期很重要，一段時間後即變成一定值且比較起濾餅阻抗小很多。
3. 濾餅阻抗：是最主要的，它將隨著濾程 (FILTER RUN) 而改變，在過濾開始時等於 0 隨後因固形物連續堆積而穩定的增加。

Theory: Filter presses are manufactured to separate solids from slurries. This machine comprises of several main components including the structured frame, plates, filter cloths and various modular components designing for the purpose of automation. During the process of filtration, the filter cloth plus the increasing accumulated thickness of the filter cakes will generate resistance against the flow. More and more hydraulic forces required to overcome this resistance. Once a compact filter cake be formed inside the filter press, it will be discharged out of the machine.

Slurry flow will encounter and suffering following three types of resistances, and the total pressure drops(-ΔP) equals to the sum of them.

Type 1: Piping friction resistance — It is minor and irrelative small and it can be ignored compared to the other two types of resistance.

Type 2: Filter cloth resistance — The initial value of resistance of the brand new cloth was totally different from the used filter cloth, the filter cloth resistance will be gradually increasing and this resistance will be reached a steady value after certain period of operational times. But, still, this resistance forces was much more less than the filter cakes' resistance.

Type 3: Filter cakes' resistance — This is the major forces which no one can ignore it. The resistance caused by filter cakes will be subjected to change caused by machine's filter run. Resistance is starting from zero ,then, it will be graduated increasing to a higher value after cakes continuous deposition.

$$\text{Darcy 方程式: } \frac{\Delta P}{L} = \frac{\mu}{K} \cdot \frac{dV}{dt} \cdot \frac{1}{A}$$

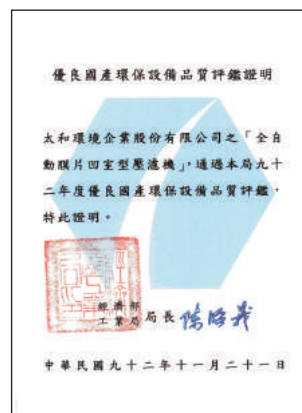
$$\text{即: } Q = \frac{dV}{dt} = K \cdot \frac{A\Delta P}{\mu L}$$

- Q --- 液體通過介質層的體積流速
- L --- 介質層的厚度
- μ --- 液體黏度
- A --- 過濾面積
- K --- 介質層滲透率

專利及得獎：系列產品已申請取得超過 10 項專利，並多次榮獲工業局頒發優良國產環保設備品質認證

Patents and awards:

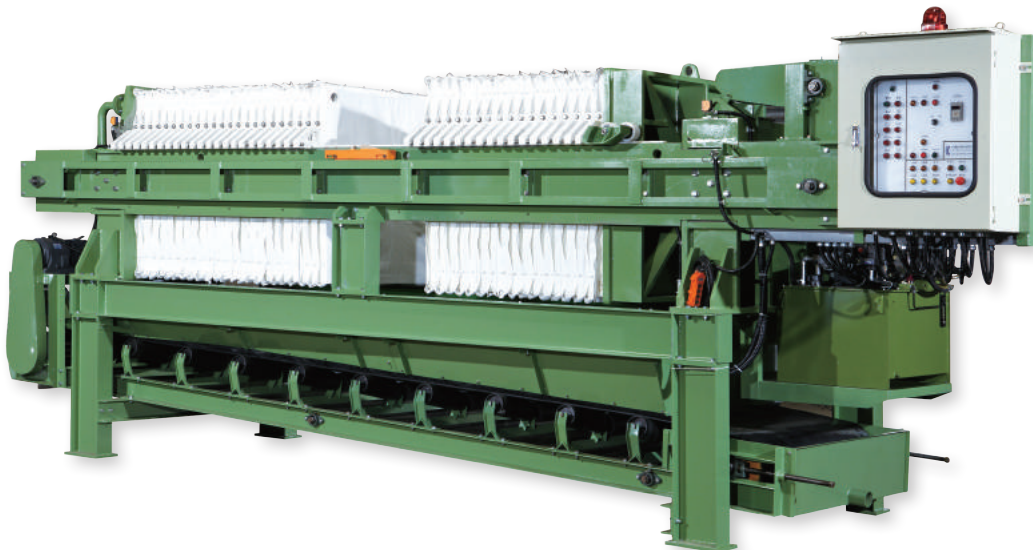
Diamond series products, with over 10 patents, had won "ROC's excellent environmental equipment" certificates many times from Industrial Development Bureau, Ministry of Economic Affairs, ROC.





壓濾機標準配備：

1. 本體機台大架結構：機前端（Head End）、固定端（Fixed End）、移動板（Traveling End）及邊掛橫樑（Side Bar）均為實心鋼板製作，並以凹凸榫接方式結合及高張力螺絲鎖固，經過安全強度計算，可以耐高壓力操作更適合污泥脈動進料負載。端板面保證 5 年之絕對平整及不撓曲變形。
2. 表面塗裝：SSPC-SP10 噴砂除銹處理後，以一道紅丹底漆 + 兩道耐酸鹼 Epoxy 面漆。
3. 油壓驅動機構：複動（Double acting）電動液壓缸，自動前後退及補壓。
4. 濾板：橡膠濾板（SRRM）設計內部補強芯板採用厚鋼板，全面橡膠模塑包覆；聚丙烯（Polypropylene）濾板採高溫高壓一體成型 + 機械銑床車製，能創造出明流 / 暗流等多種功能。所有濾板均採強化式多『支撐突壘（Stay bosses）』設計，機械強度足且密合性佳。
5. 支撐提把：聚丙烯（PP）製，每一個提把均具有前後互相頂抵之設計，以防止勾板機撞擊或牽引時鬆脫。
6. 濾布：定位銷雙面披掛式，PP 或 PA（尼龍）製，進料孔穿頸部雙層防水縫製。
7. 控制系統：內外門（含玻璃門）雙進式，箱體 SS41 烤漆 + 三菱 PLC + 屋內型固定機台式，可設定為自動（連續 cycle）或手動模式。
8. 液壓驅動勾板機：液壓驅動自動逐一勾退型，運動壓力 $\geq 20\text{kg/cm}^2$ 可確實勾取，操作快速穩定，保固 3 年運轉順暢不摔落濾板。
9. 進料閥：氣動球閥。
10. 移動式按鈕：可以自動連續逐一退板、手動逐一退板且於自動操作中可暫停後繼續回復自動程序，以利隨時觀察落料及故障排除。
11. 逆向吹心（Core blow）：利用高壓空氣使進料孔淨空，防止濾板偏壓變形。
12. 濾餅輸送機：三輥式輸送帶 + 驅動滾輪橡膠包覆，皮帶兩側呈 20° 傾斜凹槽，具備濾液或清洗廢水收集導流的功能。保固 3 年滾輪不打滑，支撐滾輪不積泥。



Standard fittings for filter press

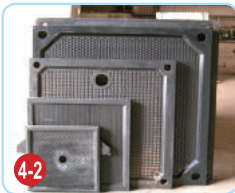
1. Filter press machine body : Filter machine body comprises of structured frames, Head End, Fixed end, Traveling End and side Bars etc. They all made of rigid steel with rib reinforced construction steel, the side bars are wedged into pockets in the ends of the press frame and fastened by high-tension bolts. The stress loads are calculated to ensure maximum absorption of all mechanical forces. It is suitable for high-pressure operation and sludge pulsation feeding process.
2. Painting and surface coating : After SSPC-SP10 sand spraying corrosive treatment process, then brush one layer of base paint on the metal surface plus two more layers of acid/alkaline-proof Epoxy paint.
3. Hydraulic driven Mechanism : Double acting electrical driven hydraulic cylinder with automatic moving and pressure compensation.
4. Plates : Rubber plates were made by heavy duty steel construction plate cover by molding rubber throughout (SRRM). Polypropylene plates were made by injection molding and integral shape to create internal or external drainage types. All plates were design for high temperature environment use, with reinforcement stay bosses design concept to ensure the whole operational process was in a leak free (watertight), deformation free and acid/alkaline-proof operation.
5. Support handles : Handles were made by polypropylene, with baffles design concept to prevent slip off the plate by plates moving shifter.
6. Filter Cloth : Double faces fixed panoply with pin, made by PP or PA (nylon) material to ensure that cakes are easy to drop off.
7. Control system : Automatic/manual setting, Two way, Double windows (including a glass door) with weather- proof control pannel, colorful paint outlook.
8. Hydraulic driven shifter : Hydraulic force was large enough to keep all the working stacks of filter plate in alignment and in position. Trouble free away from any risk of insufficient thrust/pushing forces and wrong-signal current conductivity. Hydraulic driver is better than air / electrical driven mechanism.
9. Feeding Valve : Air active ball valve.
10. Moving control button : During the auto-operate mode, the filter plates can be automatically or manually shifted in position one by one. If we interrupt and stop its auto-operate mode manually or temporality, the machine can be back to its auto-operating mode again sooner after trouble shooting services finished.
11. Cross-flow core blow : Using compressed air to purge feeding inlet hole to prevent the filter plates deformed by imbalanced chamber pressure.
12. Belt Conveyor : It was designed with 20° trough belt idlers and rubber molded steel roller to ensure that filtrate is easy to collect and prevent the roller skidded.

壓濾機選擇配備：

21. 液滴承接和卸餅導板：自動液壓驅動型雙開式翻板
22. 加藥調理設備：將調理劑添加進入污泥濃縮槽，攪拌均勻利於濾餅剝落和脫水效率。
23. 預敷系統：自動化預敷矽藻土溶液於濾布上。
24. 濾布清洗機：自動箱罩 (BOOTH TYPE) 台車行走式，高壓近距離同時沖洗兩面濾布。
25. 濾餅剝落機構：移動式濾布曲張逐一振打型。
26. 耐蝕處理：固定端、移動端鋼板及進出流管接液面均以硬質耐酸鹼橡膠包襯 (Lining)。保固 3 年防止鋼板接液面及鋼管腐蝕。
27. 安全電眼或緊急拉繩。

Option fittings for filter press

21. Drip tray and Cake dump carts : Hydraulic open & closure, for cakes collecting and dumping.:
22. Dosage condition : Investing chemical additive into slurry tank, mixing it well, it helps cakes to drop off easily out of the cloths and upgrading the sludge drying efficiency.
23. Pre-coat system : Pre-coat diatomite solution onto filter cloths.
24. Washing machine for filter cloths : Movable booth type washing machine, equips with high pressure water injection nozzles to purge plate's filter cloths from both sides.
25. Cakes discharging device : Plates move individually and cakes discharge automatically by cloths shaking.
26. Anti- corrosion treatment : Fixed-end and moving-end grid and inner surface of inlet pipe are molded with rubber lining.
27. Safety monitoring device or emergency ropes.



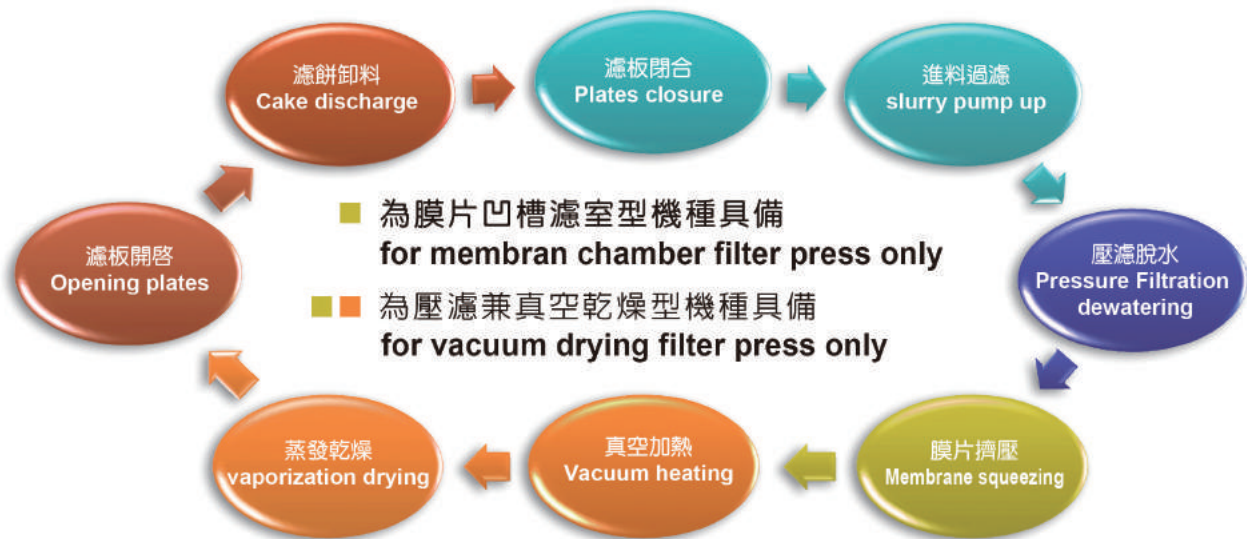


操作說明：

先以單一濾布穿頸披掛於每一片濾板後，如植樹原理般將濾板併合排列整齊，兩兩濾板間形成內部中空之濾室，各濾板與濾室間只有進料隧道貫通。當機器以油壓缸機構閉合擠緊濾板確認後，將濃縮過之泥漿料藉由進料泵，把泥漿料高壓擠送進入濾室，水被濾出而污泥固形物逐漸堆積於濾室內形成污泥餅，於是餵入越多的污泥固形物可以得到越低含水率的濾餅，當漿料幾近無法進入濾室後，停止泵運轉並關閉進料閥，執行空氣膜片壓榨之二次加壓程序，可膨脹的膜片以反向擠壓力量使原已乾涸之濾餅含水率更為降低，直到設定時間滿意後，油壓缸後退，並以高速穩定型之勾板機械逐一或全面開啓濾板之方式，使污泥餅自動掉落到運轉中的皮帶輸送機上，送到儲存斗或太空袋集中儲存。當濾布有堵塞之虞時，啓動清洗機按鈕執行自動清洗作業，勾板機及清洗台車將互動式逐一移動濾板至正確位置，管排式噴嘴由上至下來回運動，高達 20kg/cm² 以上的清水自噴嘴射出近距離連續沖洗濾布 1 或 2 循環。自動化膜片式壓濾機之生產力約為大小相似之標準型壓濾機之 2 倍。

Employing corrugated filter plate with membranes adhering to cores, filter cloth is draped over each filter plate to form orderly filter plates like tree-planting formation; between two filter plates forms a hollow screening chamber with feed tunnels channeling through the filter plates and screening chambers. Once the hydraulic cylinder is triggered to close the filter plates, the concentrated sludge is sent into the screening chambers via hydraulic pump; liquid is then drained to deposit sludge cake in the chambers. Hence the more sludge is fed the lower is the sludge cake's water content. When the chambers reach capacity where sludge can no longer enter, stop the pump and close the feed valve, then execute the second squeezing procedure. The expandable membrane reverse force will further reduce the moisture content of the already caking sludge until the set time lapses. Restart the hydraulic device, and turn on individual or all filter plates via the high-stability shifter for sludge cake to fall automatically into the running conveyor for transporting to the storage silo or catcher bags. When filter cloth clogging occurs, press the auto-wash button to execute cleaning procedures; the shifter and the washer will move the filter plates to correct position individually; the array of spray nozzles will move up and down, jetting out 20 kg/cm² water to continuously clean the fabric cloth at close range for one or two cycles.

操作步驟 Operating cycle

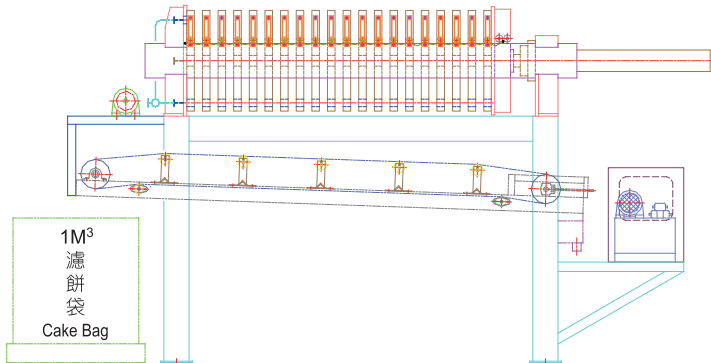


- 濾板油壓機構閉合壓力 100 ~ 250 kgf/cm²
- 膜片二次加壓供氣壓力 1 ~ 16 kgf/cm²
- 進料泵壓力 5 ~ 25 kgf/cm²
- 低壓廢熱蒸氣 15 psi

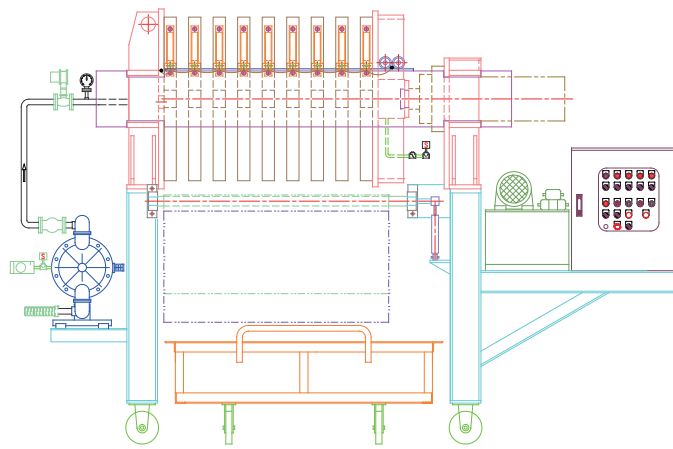
- Hydraulic press of plates closure is 100~250 kgf/cm²
- Compressed air pressure of membrane squeeze is 1~16 kgf/cm²
- Feeding pump pressure is 5~25 kgf/cm²
- Utility supplied waste steam pressure is 15psi

快開式壓濾機 Quick-open Filter Press : FP-□□-□□(E) FP-□□-□□PP(E) FP-□□-□□AP(E) FP-□□-□□AAP(E)

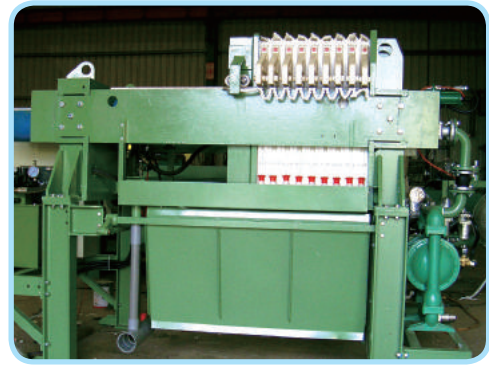
快開式組立圖
Quick-open Filter Press diagram



翻板式組立圖
Turnover pan type diagram



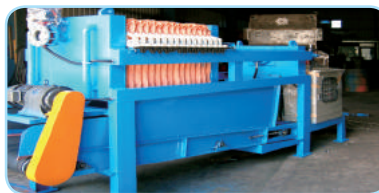
濾板數量 (PC) Number of plates	10~41
濾板材質 Plates materials	Rubber/ Polypropylene
濾板尺寸 (mm) Plates sizes	□ 630, □ 710, □ 800 □ 930, □ 1000, □ 1250, □ 1300
濾室厚度 (mm) Chamber thickness	25,30,35,40,45
過濾面積 (m²) Filtration area	5.4~106
濾室容積 (L/cycle) Chamber volume	69~222
退板方式 Plates shifting	一次 / 二次快開 Chain fast open



▲ CK-FP80-9AP



▲ Truck moving type



▲ CK-FP63-15PP



▲ CK-FP130-40



▲ CK-FP63-15PP



▲ Pilot machine



▲ CK-FP80-15AAP

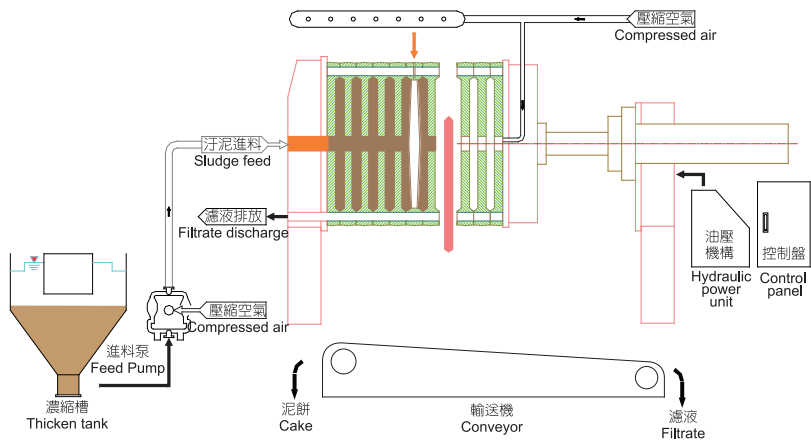


▲ CK-FP130-40

型號 * Type	過濾面積 Filtration Area(m²)	濾室厚度 * Chamber Thickness(mm)	濾室容積 Chamber Volume(L)	長度 Length(mm)	寬度 Width(mm)	高度 Height(mm)	空機重量 Weight(kg)	油壓泵 Hydraulic Pump(Hp)	輸送機 Conveyor(Hp)
CK-FP63-10PPE	5.4	30	69	2,377	950	1,300	1,500	2	—
CK-FP63-20PP	11.5	30	146	4,350	950	1,300	2,500	2	1
CK-FP80-20PPE	18.1	30	271	4,500	1,240	1,800	3,000	5	—
CK-FP80-20PP	18.1	30	271	4,950	1,240	1,930	3,700	5	2
CK-FP80-36PP	33.3	30	499	5,670	1,240	1,930	4,500	5	2
CK-FP100-31PP	46.8	30	702	5,520	1,520	2,280	6,100	5	2
CK-FP125-41PP	105.6	30	1,584	7,430	1,690	2,530	12,000	7.5	3
CK-FP125-20	46.9	45	1,011	5,750	1,690	2,530	13,500	7.5	3
CK-FP125-40	96.3	45	2,076	7,390	1,690	2,530	20,000	7.5	3
CK-FP130-20	49.4	45	1,056	5,750	1,690	2,530	13,800	7.5	3
CK-FP130-40	101.4	45	2,167	7,390	1,740	2,580	20,800	7.5	3
CK-FP80-15AAP	12.8	30	203	4,270	1,240	1,800	3,500	5	2

* 型號繁多僅列代表性機型供參考。 ※ 濾室厚度 30-50mm 均可，上表僅舉例其一，濾室容積依濾室厚度而變。

膜片式壓濾機 Membrane Chamber Filter Press: FP-□□□-□□A FP-□□□-□□AP FP-□□□-□□AAP



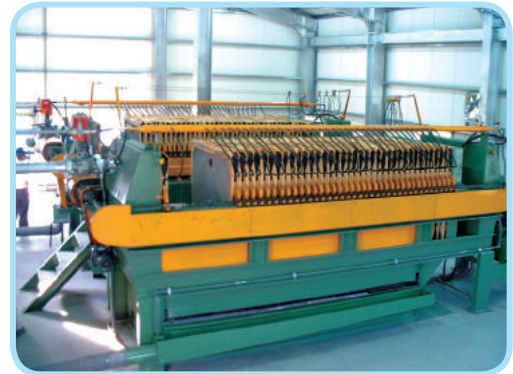
濾板數量 (pc) Number of plates	21~111
濾板材質 Plates materials	Rubber/ Polypropylene
濾板尺寸 (mm) Plates sizes	□ 800, □ 930, □ 1000, □ 1250, □ 1300, □ 1500
濾室厚度 (mm) Chamber thickness	30,35,40,45,50
過濾面積 (m ²) Filtration area	19~435
濾室容積 (L/cycle) Chamber volume	285~6,460
退板方式 Plates shifting	液壓驅動勾板機 Hydraulic Separator



▲ CK-FP130-56A



▲ CK-FP100-51AP



▲ CK-FP130-38A



▲ CK-FP130-64A



▲ CK-FP100-61AP



▲ CK-FP125-45A



▲ CK-FP100-41AP



▲ CK-FP100-51AP

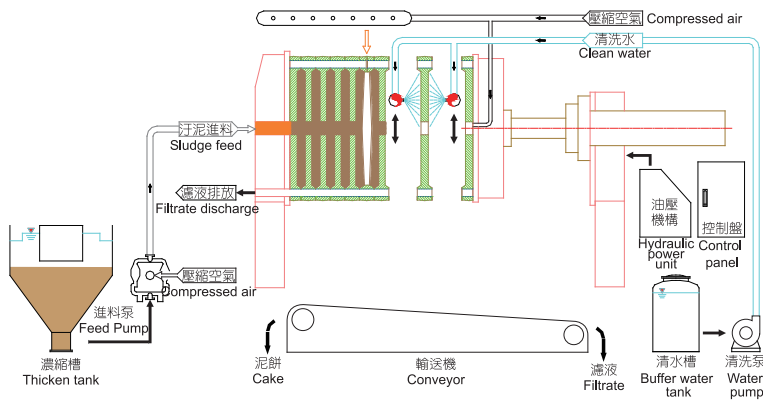
型號 * Type	過濾面積 Filtration Area(m ²)	濾室厚度 * Chamber Thickness(mm)	濾室容積 Chamber Volume(L)	長度 Length(mm)	寬度 Width(mm)	高度 Height(mm)	空機重量 Weight(kg)	油壓泵 Hydraulic Pump(Hp)	輸送機 Conveyor(Hp)
CK-FP80-25AP	22.8	30	308	4,707	1,300	1,930	4,300	5	2
CK-FP80-41AP	38.0	30	513	5,780	1,300	1,930	5,200	5	2
CK-FP100-41AP	62.4	30	883	6,140	1,520	2,280	7,500	5	2
CK-FP100-51AP	78.0	30	1,104	6,835	1,520	2,280	8,500	5	2
CK-FP100-61AP	93.6	30	1,324	7,530	1,520	2,280	9,300	5	3
CK-FP100-71AP	109.2	30	1,545	8,225	1,520	2,280	10,000	5	3
CK-FP125-51AP	132.0	30	1,792	7,198	1,690	2,530	12,800	7.5	3
CK-FP125-61AP	158.4	30	2,150	7,943	1,690	2,530	13,800	7.5	3
CK-FP125-71AP	184.8	30	2,508	8,688	1,690	2,530	15,000	7.5	3
CK-FP150-71AP	270.2	30	4,053	8,895	1,940	2,960	20,000	7.5	3
CK-FP130-40A	101.4	45	2,167	6,680	1,740	2,750	20,500	7.5	3
CK-FP130-68A	174.2	35	2,895	8,297	1,740	2,750	28,500	7.5	3

* 型號繁多僅列代表性機型供參考。 ※ 濾室厚度 30-50mm 均可，上表僅舉例其一，濾室容積依濾室厚度而變。



自動清洗型壓濾機： Automatic Cloth Wash Filter Press:

FP-□□□-□□PPW FP-□□□□-□□APW FP-□□□□-□□AW



濾板數量 (pc) Number of plates	30~111
濾板材質 Plates materials	Rubber/ Polypropylene
濾板尺寸 (mm) Plates sizes	□ 1000, □ 1250, □ 1300, □ 1500, □ 2000
濾室厚度 (mm) Chamber thickness	30,35~50
過濾面積 (m ²) Filtration area	42~736
濾室容積 (L/cycle) Chamber volume	640~14,300
退板方式 Plates shifting	液壓驅動勾板機 Hydraulic Separator



▲ CK-FP125-65APW



▲ CK-FP130-38A



▲ CK-FP130-64AW



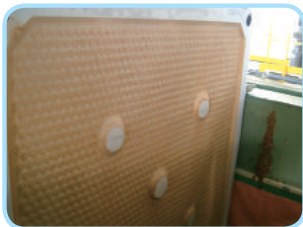
▲ CK-FP125-65APWx2



▲ Front view of Automatic Wash Filter Press



▲ End view of dehydrator room



▲ Cloth before wash



▲ Arrays of nozzles moving down



▲ Nozzles spraying



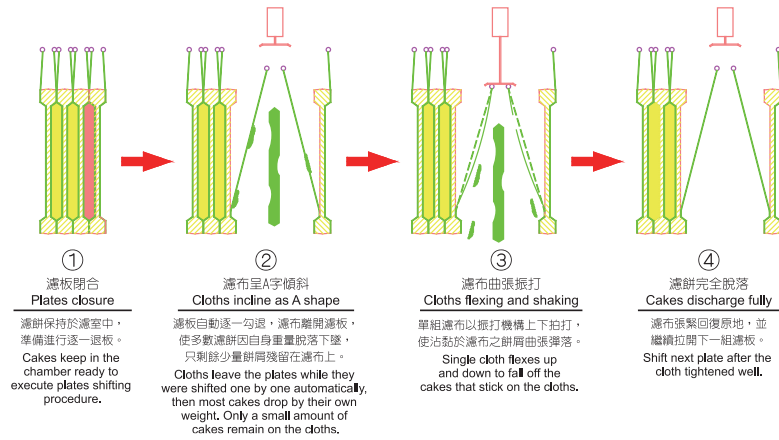
▲ Cloth washing finished

型號* Type	過濾面積 Filtration Area(m ²)	濾室厚度* Chamber Thickness(mm)	濾室容積 Chamber Volume(L)	長度 Length(mm)	寬度 Width(mm)	高度 Height(mm)	空機重量 Weight(kg)	油壓泵 Hydraulic Pump(Hp)	輸送機 Conveyor(Hp)	台車機構 Booth Driver(Hp)
CK-FP80-35APW	32.3	30	436	5,872	1,800	3,055	6,500	5	2	2
CK-FP100-51APW	78.0	30	1,104	7,085	2,000	3,335	10,500	5	2	2
CK-FP125-65APW	169.0	30	2,293	8,540	2,250	3,775	16,600	7.5	3	2
CK-FP150-50PPW	189.1	30	2,837	7,330	2,490	4,370	18,500	7.5	3	2
CK-FP150-71APW	270.2	30	4,053	9,195	2,490	4,370	22,500	7.5	3	2
CK-FP150-81APW	308.8	35	5,400	10,570	2,490	4,370	24,500	7.5	5	2
CK-FP200-91APW	612.0	40	10,080	11,420	3,000	5,670	35,000	10	5	2
CK-FP130-64AW	163.8	45	3,500	8,950	2,300	3,875	30,000	7.5	3	2
CK-FP150-70AW	270.5	35	4,520	8,980	2,590	4,470	46,000	10	5	2
CK-FP150-80AW	309.7	38	5,649	10,130	2,590	4,470	51,000	10	5	2
CK-FP150-90AW	348.9	45	7,501	11,380	2,590	4,470	56,500	10	5	2

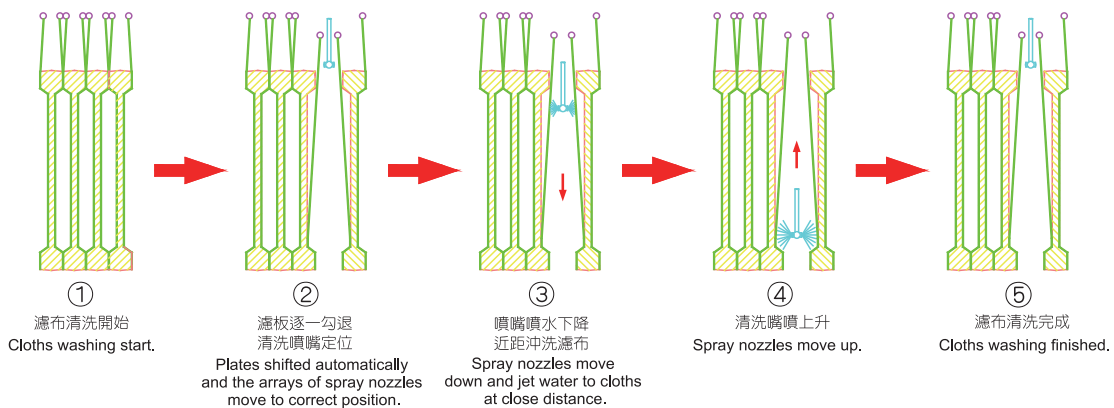
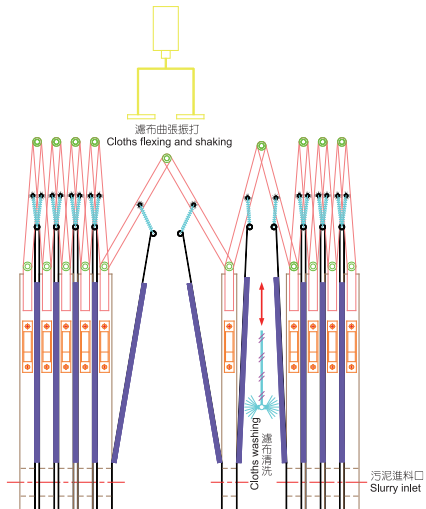
* 型號繁多僅列代表性機型供參考。 ※ 濾室厚度 30-50mm 均可，上表僅舉例其一，濾室容積依濾室厚度而變。

自動落料型壓濾機 Automatic Cakes Discharge Filter Press:

FP-□□□-□□PPWN FP-□□□-□□APWN FP-□□□-□□AWN



濾板數量 (pc) Number of plates	30~111
濾板材質 Plates materials	Rubber/ Polypropylene
濾板尺寸 (mm) Plates sizes	□ 1000, □ 1250, □ 1300, □ 1500, □ 2000
濾室厚度 (mm) Chamber thickness	30,35~50
過濾面積 (m ²) Filtration area	42~736
濾室容積 (L/cycle) Chamber volume	640~14,300
退板方式 Plates shifting	液壓驅動勾板機 Hydraulic Separator



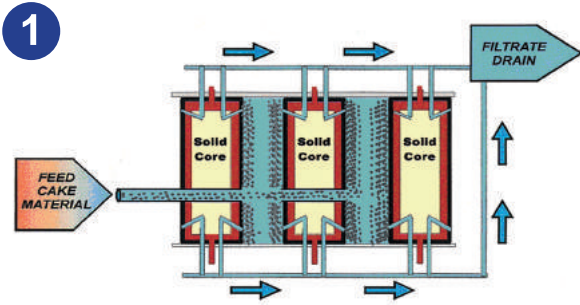
型號 * Type	過濾面積 Filtration Area(m ²)	濾室厚度 * Chamber Thickness(mm)	濾室容積 Chamber Volume(L)	長度 Length(mm)	寬度 Width(mm)	高度 Height(mm)	空機重量 Weight(kg)	油壓泵 Hydraulic Pump(Hp)	輸送機 Conveyor(Hp)	台車機構 Booth Driver(Hp)
CK-FP125-65APWN	169.0	30	2,293	8,540	2,250	5,000	18,500	7.5	3	2
CK-FP150-71APWN	270.2	30	4,053	9,195	2,490	5,500	25,000	7.5	3	2
CK-FP150-81APWN	308.8	35	5,400	10,570	2,490	5,500	27,000	7.5	3	2
CK-FP200-91APWN	612.0	40	10,080	11,420	3,000	6,800	37,000	10	5	2
CK-FP130-64AWN	163.8	45	3,500	8,950	2,300	5,100	30,000	7.5	3	2
CK-FP150-60AWN	270.5	35	4,520	8,980	2,590	5,600	42,000	10	5	2
CK-FP150-80AWN	309.7	38	5,649	10,130	2,590	5,800	53,000	10	5	2
CK-FP150-90AWN	348.9	45	7,501	11,380	2,590	5,800	58,000	10	5	2
CK-FP150-110AWN	427.3	45	9,187	13,080	2,590	6,000	63,000	10	5	2

* 型號繁多僅列代表性機型供參考。 ※ 濾室厚度 30-50mm 均可，上表僅舉例其一，濾室容積依濾室厚度而變。



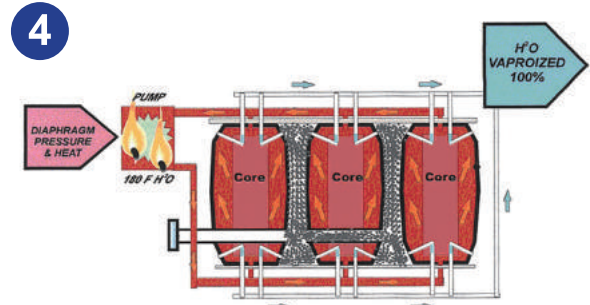
真空乾燥壓濾機 Vacuum drying filter press

操作流程 Operation flow



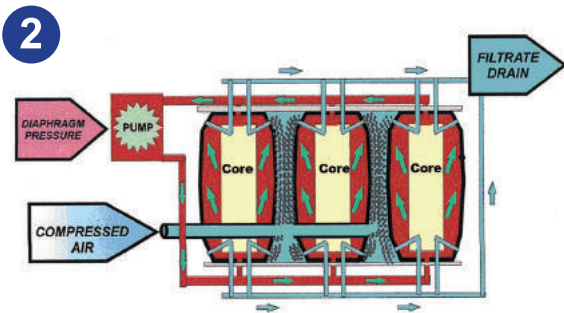
如同傳統壓濾機般，進料泵餵入漿料並對濾餅進行過濾和壓榨，最後仍有一些水份會殘存在濾餅顆粒內狹小無效的空隙中。

The vacuum drying filter press operates as a standard press, compressing the cake material with the feed pump. There will always be moisture remaining in the small void spaces between the solid cake particles.



循環的蒸汽或熱水隔著膜片將熱量傳遞給濾餅；且真空作用使得水份容易地在較低的溫度中蒸發。

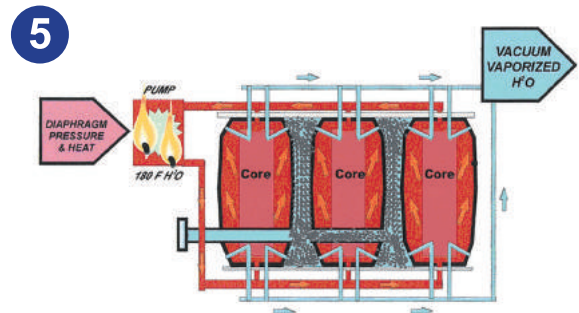
Heat is transferred to the cake from steam or hot water circulating through the core of membrane plate. The vacuum allows the moisture in the cake to vaporize at a reduced temperature.



膜片擠壓：膜片受到壓縮空氣或蒸汽鼓脹而進一步使濾餅的體積和水份減少。經過這種標準型膜片式壓濾機後，大多數的自由水均能被移除。

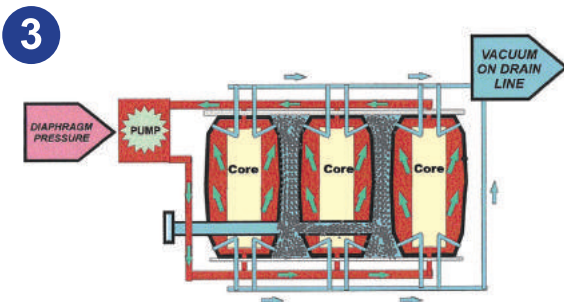
Membrane plate squeeze: compressed air or steam cause expansion of the membrane plates, further reducing cake volume and moisture content.

Free water is removed through this standard membrane filter operation.



當濾餅乾燥並縮小體積後，有鼓脹構造的膜片式濾板仍可以全程持續的執行熱傳導而達完全乾燥。

As the cake dries and loses volume, the membrane plate construction allows the diaphragm to expand and maintain heat transfer throughout the drying cycle.

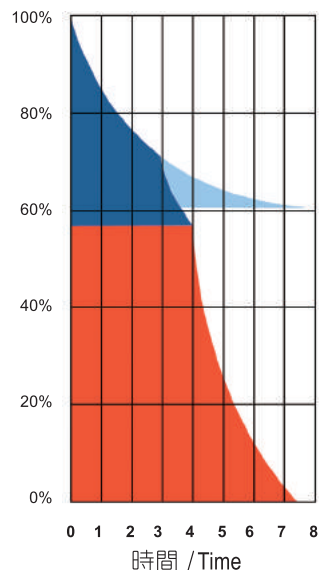


完成膜片擠壓並關閉進料管後乾燥程序於焉開始：此時濾餅仍保持於壓濾機中，在排放濾液的管線上抽真空。

The drying process begins after the membrane squeeze and slurry inlet closed.

While the filter cakes are still close in the press, a vacuum is pulled on the liquid drain lines.

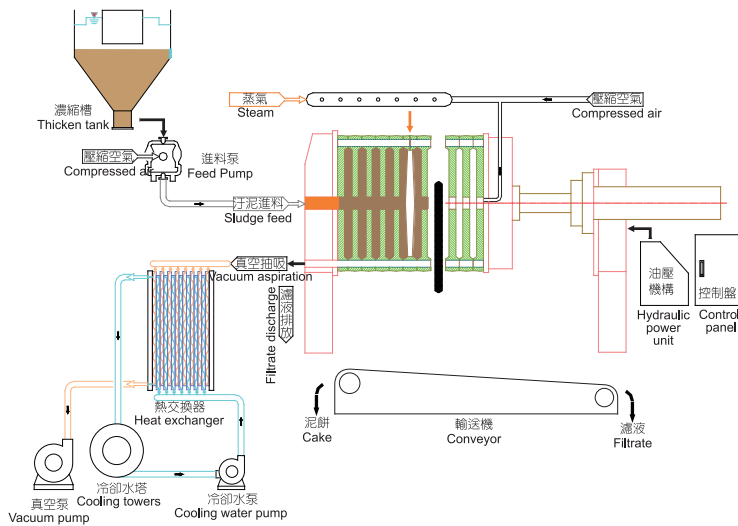
濾餅含水率 / Percent moisture



圖解各種壓濾機脫水乾燥效率
CHART Dewatering and drying efficiency

- 傳統式壓濾機
Standard press
- 膜片式壓濾機
Membrane press
- 壓濾乾燥機
Vacuum drying filter press

真空乾燥型壓濾機 Vacuum Drying Filter Press : DV-□□□-□□ DV-□□□-□□A



濾板數量 (pc) Number of plates	10~90
濾板材質 Plates materials	SUS304 Steel+ Macromolecular substance
濾板尺寸 (mm) Plates sizes	□ 600, □ 1000, □ 1250, □ 1300
濾室厚度 (mm) Chamber thickness	25,30,35,40,45
過濾面積 (m ²) Filtration area	5.4~231
濾室容積 (L/cycle) Chamber volume	69~4,940
退板方式 Plates shifting	快開或液壓勾板機 Chain open or Hydraulic separator

- ◎ 一次完成壓濾脫水及乾燥程序，不需分段乾燥設備及濾餅搬運人力。
- ◎ 濾餅在壓濾機內密閉高溫殺菌，避免人員曝露於細菌感染環境。
- ◎ 技術領先經驗豐富：
巧妙結合運用熱傳與真空技術，迅速蒸發排出水份。
- ◎ 能源消耗低：
使用工廠低壓廢熱蒸氣或熱水，大幅節省能源費用。
- ◎ 濾布潔淨無須清洗：
乾燥後的濾餅水份大幅降低，黏度係數變小，濾餅從濾布剝離乾淨利落。
- ◎ 專利的模塑技術：
專利型濾板具有膜片二次加壓功能，可灌充各種流體有效的減少濾餅殘留水份。
- ◎ 嚴格的製造品質：
每塊濾板均經過標準的品質製造程序，嚴格的測試檢查。

- ◎ Dewatering and drying the slurry while it is in the filter press, needn't expensive follow-on thermal dryer and cakes carrying.
- ◎ Completely pasteurizes sludge inside the press, avoid the exposure to pathogen.
- ◎ Excellent technology and experience: Apply the combination between heat transformation and vacuum technology, moisture is vaporized out rapidly from press cake.
- ◎ Low energy consumption: It can use lower pressure waste steam or hot water to save large energy cost.
- ◎ Cloths clean enough, no further washing required: Since the cake's moisture content was educed largely, the viscosity coefficient was small, it makes the cloths remain roughly clean after cakes drop off.
- ◎ Patented molding plates: Various fluids can follow through the patented membrane plates safe to reduce cake's volume and moisture.
- ◎ Strict quality in manufactured process: Every product is made under ISO 9002 standard and passes quality examination.



型號 * Type	過濾面積 Filtration Area(m ²)	濾室厚度 * Chamber Thickness(mm)	濾室容積 Chamber Volume(L)	長度 Length(mm)	寬度 Width(mm)	高度 Height(mm)	真空系統佔地 Space of Vacuum system	空機重量 Weight(kg)	油壓泵 Hydraulic Pump(Hp)	真空泵 Vacuum Pump(Hp)
CK-FP100-50A	72.0	30	1,081	6,642	1,520	2,280	3.5m×1.2m	13,500	5	15
CK-FP130-35A	88.4	35	1,469	5,920	1,740	2,750	3.8m×1.3m	14,000	7.5	20
CK-FP130-56A	143.0	35	2,377	7,433	1,740	2,750	3.8m×1.5m	18,800	7.5	25
CK-FP130-75A	179.4	45	4,111	9,550	1,740	2,750	4.2m×2.0m	23,500	7.5	40

* 型號繁多僅列代表性機型供參考。 ※ 濾室厚度 30-50mm 均可，上表僅舉例其一，濾室容積依濾室厚度而變。



壓濾機選用計算範例

1. 設計基準：

處理能量：1,500 kg DS/16hr-set

設計處理批次數 (Nc):4 cycle/16hr-set (依據污泥性質、濃度及經驗決定)

絕乾污泥真比重 (C_D):2.5

脫水後濾餅含水率：≤ 65%

脫水後濾餅固形物含量 (C_s):100%-65%=35% (乾度)

2. 濾餅容積計算：

濾餅密度計算公式：
$$\frac{1}{C_w} = \frac{1-C_s}{C_{wA}} + \frac{C_s}{C_D}$$

上式中，C_w 為污泥（餅）的密度

C_{wA} 為水的密度：1.0

依據上式公式計算求得（或依據對照表）：

進流污泥漿濃度為 4% 時之密度 = 1.025

脫水後濾餅固形物含量 35% 時之密度 = 1.266

批次負荷濕濾餅重 (S_w)=1,500 kgDS/16hr-set ÷ 4 cycle/16hr-set ÷ 35%= 1,071.4 kg/cycle

批次最終濾餅體積量 (V_s) = 1,071.4 kg/cycle ÷ 1.266 kg/Ltr= 846.3 Ltr/cycle

3. 濾板數量選用計算：

濾室設計厚度 (L) = 30 mm

選用濾板尺寸 (W_p):1,000mm × 1,000mm

每個濾室過濾面積 (A_c):1.56 m²/Chamber

每片濾板之濾室容積 (V_c):22.07 Ltr /Chamber

假設最終濾餅厚度 (L_s)=24mm

膜片擠壓後濾餅體積佔濾室容積比例 (R_v)=24mm÷30mm=80%

膜片式濾板之濾室需求量 (N_r) = 846.3 Ltr/cycle ÷ 22.07 Ltr/Chamber÷80%= 47.9 Chamber

∴濾室選用量 (N_s) = 48 Chamber，考慮餘裕容量使用 50 Chamber 設計之

濾板選用數量 = 51 片（頭板、尾板接觸端板面之面積及容積不能計）

選用機型：CK-FP100-51AP×1 set OK.

總有效過濾面積 (A_T)= 1.56 m²/Chamber×50 Chamber=78.0 m²

總有效濾室容積 (V_T)= 22.07 Ltr /Chamber×50 Chamber=1,104 Ltr

註 1: 依污泥阻抗係數之差異，濾布表面過濾累積形成之濾餅層有效厚度，通常約 10~20mm，一般採取 15mm 為設計值，每一濾室有兩個過濾面，因此濾室內濾餅層總有效厚度 15mm×2=30mm

註 2: 1.56m²/pc+2 面 /pc× 室深 30mm × 94.32% (有效空間比率) = 22.07 Ltr/Chamber

常用濾餅密度表（絕乾污泥真比重 VS 濾餅含水率）

含水率 / 真比重	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.50
98.0%	1.000	1.004	1.007	1.009	1.010	1.011	1.012	1.013	1.014	1.014
97.0%	1.000	1.006	1.010	1.013	1.015	1.017	1.018	1.019	1.020	1.022
96.0%	1.000	1.008	1.014	1.017	1.020	1.023	1.025	1.026	1.027	1.029
95.0%	1.000	1.010	1.017	1.022	1.026	1.029	1.031	1.033	1.034	1.037
90.0%	1.000	1.020	1.034	1.045	1.053	1.059	1.064	1.068	1.071	1.077
85.0%	1.000	1.031	1.053	1.069	1.081	1.091	1.099	1.106	1.111	1.120
83.0%	1.000	1.035	1.060	1.079	1.093	1.104	1.114	1.121	1.128	1.138
80.0%	1.000	1.042	1.071	1.094	1.111	1.125	1.136	1.146	1.154	1.167
75.0%	1.000	1.053	1.091	1.120	1.143	1.161	1.176	1.189	1.200	1.217
70.0%	1.000	1.064	1.111	1.148	1.176	1.200	1.220	1.236	1.250	1.273
65.0%	1.000	1.075	1.132	1.176	1.212	1.241	1.266	1.287	1.304	1.333
60.0%	1.000	1.087	1.154	1.207	1.250	1.286	1.316	1.341	1.364	1.400
55.0%	1.000	1.099	1.176	1.239	1.290	1.333	1.370	1.401	1.429	1.474
50.0%	1.000	1.111	1.200	1.273	1.333	1.385	1.429	1.467	1.500	1.556
40.0%	1.000	1.136	1.250	1.346	1.429	1.500	1.563	1.618	1.667	1.750
30.0%	1.000	1.163	1.304	1.429	1.538	1.636	1.724	1.803	1.875	2.000
20.0%	1.000	1.190	1.364	1.522	1.667	1.800	1.923	2.037	2.143	2.333

鑽石牌的設計堅固耐用，適合精打細算的企業，客戶使用多年後的見證與推薦
 Diamond brand filter presses are rigid and durable, the best TOC(Total Operation Cost) value,
 Customers testimonies as following:

廣式工程股份有限公司提供專業施工 工程材料收據證明書

收據日期: 2011年11月21日	收據地點: 廣東省	收據編號: 1101-0107-01
收據及日期: 11月21日	地點: 廣州	收據人: 廣式工程股份有限公司
收據內容: 廣式工程股份有限公司提供專業施工	收據金額: 1101-0107-01	收據用途: 廣式工程股份有限公司

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收據內容: 廣式工程股份有限公司提供專業施工

收據金額: 1101-0107-01

收據用途: 廣式工程股份有限公司

GRUNDFOS

廣式工程股份有限公司

收據日期: 2011年11月21日

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收據內容: 廣式工程股份有限公司提供專業施工	收據金額: 1101-0107-01	收據用途: 廣式工程股份有限公司

收據日期: 2011年11月21日 收據地點: 廣東省 收據編號: 1101-0107-01

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GCE

安裝證明

廣式工程股份有限公司(TAI HO ENVIRONMENTAL ENTERPRISES CO.,LTD)於今日(西元 11月 21日),已在本公司進行了2套製泥機之安裝與測試工作,具體如下:

SELLER: TAI HO ENVIRONMENTAL ENTERPRISES CO.,LTD 72,NO.58 KUNENKWO N.ROAD,SEC.1,TAIPEI

LC NO: ABC103LC2390104

INVOICE NO: TF-9208

EQUIPMENTS: 套用: 3002388 FULLY AUTOMATIC MEMBRANE FILTER PRESS AND ACCESSORIES MODEL:CK-FP130/50A

QUANTITY: 2 SETS

特此證明!

廣式工程股份有限公司 2011.11.21

推薦書

本公司採用太和環境企業公司所設計、製造之污泥壓濾機，於1996年及2000年分別購買1台，共2台使用迄今效果良好，售後服務完善，本人同意推薦給社會大眾，特予證明。

推薦人: [Signature]

使用單位: 美利達股份有限公司

西元 2011 年 4 月 6 日

推薦書

本公司採用太和環境企業公司所設計、製造之污泥壓濾機，於2003年起購買型號 CK-FP130-64AW 等4台，分別安裝於台灣及菲律賓，使用迄今效果佳，售後服務良好，可推薦給社會各界參考採用，特予證明。

推薦人: [Signature]

使用單位: 華亞汽電股份有限公司

西元 2011 年 4 月 30 日

問題與探討:

問題一: 為什麼 cycle time 很長?

- 答: 1. 進料污泥濃度太低
 2. 濾室深度設計太大 (即過濾面積不足)
 3. 進料流量不足

問題二: 為什麼會噴漿?

- 答: 1. 大架結構製作精確度不良
 2. 濾板設計錯誤而變形
 3. 沒有逆向吹心 (core blow) 而偏壓形
 4. 無設計頭 / 尾板
 5. 油壓缸行進不同步

問題三: 濾板出軌或摔落?

- 答: 1. 勾板機驅動方式不良
 2. 勾板機械加工不精密
 3. 兩側勾板機不同步
 4. 濾板支撐提把歪斜

Q & A

Q1. Why the cycle time is long for my filter press?

Answer: 1. The slurry concentration is too low. 2. The chamber is too thick i.e the filter area is too small. 3. The inlet flow is not enough.

Q2. Why the slurry leaks out frequent?

Answer: 1. Frame structure manufacture lacks of precision. 2. The plates are distorted due to improper design. 3. No core blow function design. 4. No end plates design. 5. Hydraulic multi-cylinders moving are not synchronized.

Q3. Why the plates move off tracking?

Answer: 1. Plate shifter driving mechanism is not suitable. 2. Plate shifter is not manufactured through machine-finishing process. 3. Both side shifters moving are not synchronized. 4. Plate handles are crooked.



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太和環境企業股份有限公司

TAI HO ENVIRONMENTAL ENTERPRISES CO., LTD.

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