PRAYON

NEW DEVELOPMENT IN THE TILTING PAN FILTER TECHNOLOGY

Marc COLLIN

PRAYON TECHNOLOGIES

IFA, Vilnius, April 26th, 2006

PRAYON

CLASSICAL TILTING PAN FILTER

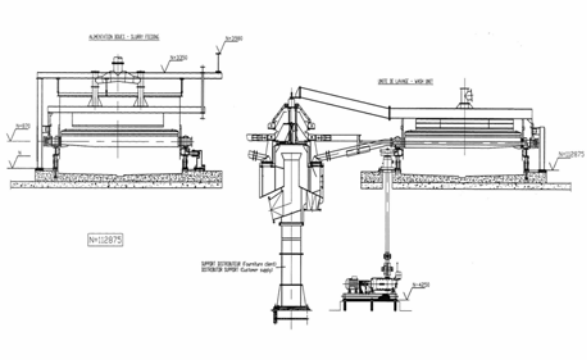
MAIN DEVELOPMENTS

- 1940's: original design – continuous process
  - Area: 5 to 6 m² - lead, wood, silk
- 1950's: stainless steels, rubber, plastics
  - Area: 60 to 80 m²
- 1960's: area: 160 m²
- 1970's: improve of efficiency and compactness
  - Cell with double sloped bottom – central aspiration distributor
- 1980's: fast drain cell (3 slopes) – increase of capacity
- 1998: active filtration of 225 m²
- 2000: compact central valve (CA or BCA)

- **2001; TDI filter**
  - **prototype started in 2003**

MAIN COMPONENTS

- Stationary framework
- Car frames, cell's bearing: 2
- Supporting rollers: 2 sets
- Filtering pans: 3 slopes – 2 rollers
- Connections hoses: torsion
- Central valve
- Drive mechanism
- Slurry feed & wash troughs
- Protective parts (hoods…)

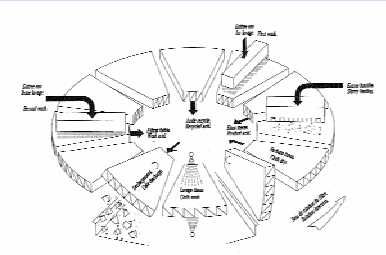


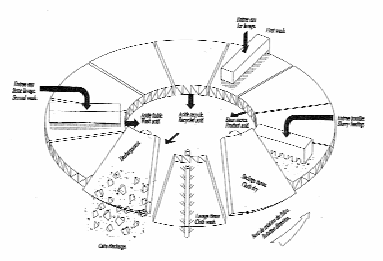
PRAYON

TDI TILTING PAN FILTER

DISCHARGE PRINCIPLE

- TDI = “Tangential DIscharge”

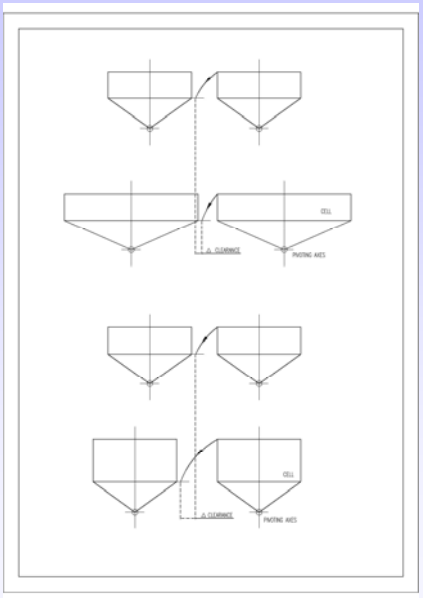




CLEARANCE

Classical TPF

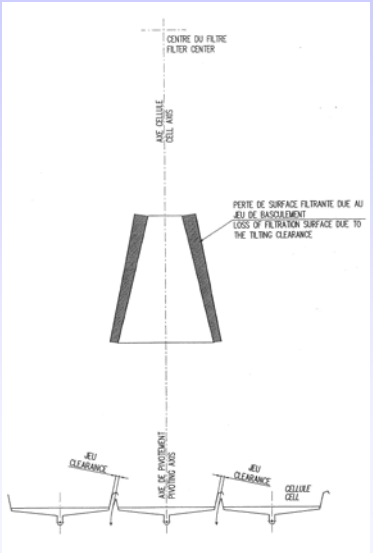
- Effect of cell's width
- Effect of cell's height



CLEARANCE

- Loss of filtration area

  ⇨ About 5% of total surface with a classical TPF

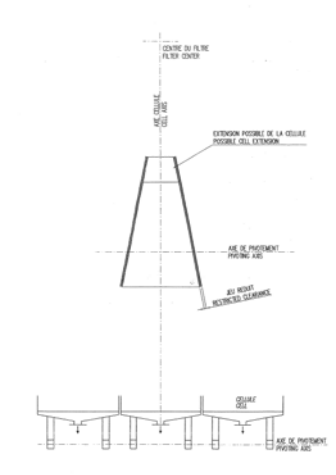


CLEARANCE

TDI Filter

- Independent of cell's width and height
- Gain of filtration area due to:
  - minimum clearance (3 cm)
  - extension towards centre

⇨ 30 to 50% of active surface with a TDI



CLEARANCE

- TDI gain of filtration area ⇨ 30 to 50% of active

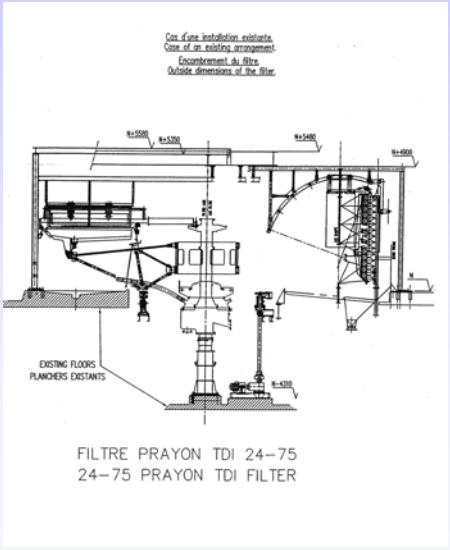
	Classical filters			TDI filters		
Active surface (dry discharge)	75 m²	90 m²	130 m²	75 m²	90 m²	120 m²
External diameter	15,9 m	16,7 m	19,9 m	14 m	14,6 m	16,7 m
Ground surface	198,5 m²	219 m²	311 m²	153,9 m²	167 m²	219 m²
SG/SA	2,64	2,43	2,39	2,05	1,85	1,82

- more compact design (see SG/SA)

TDI MAIN COMPONENTS

Reduced number of mechanical parts:

- Stationary framework
- Car frame, cell's bearing: 1
- Supporting rollers: 1 set and reduced number
- Filtering pans: 4 slopes – 1 roller – ball bearings
- Connections hoses: flexion
- Central valve
- Drive mechanism
- Slurry feed & wash troughs
- Protective parts (hoods…)



ECONOMICAL ADVANTAGES

- Price: 15 to 20% less than TPF due to
  - more compact design for given filtration area
  - reduced number of mechanical parts
  - tubular framework concept including one single car frame ring
  - smaller cake and cloth wash hoppers
  - Moreover, all related costs such as civil works cost are reduced (lower sg/sa ratio).
- Power consumption
- Maintenance costs

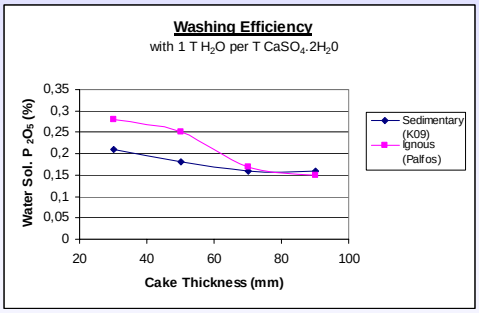
PROCESS ADVANTAGES (as TPF)

- Batch filtration
  - High P_2O_5 recovery (99%)
  - No mixing of filtrates
- Recycled gypsum
  - with the cloth wash waters are negligible (0% - 2%)

ADDITIONAL PROCESS ADVANTAGES

- Cake thickness
  - no limitation on cell 's height
    ⇨ cake of 10 cm can be contemplated

- washing efficiency increases with the cake thickness, especially when wash water is limited



ADDITIONAL PROCESS ADVANTAGES

- Acid Dilution due to
  - residual water (cloth wash water)
  - mixing between wash filtrates and feed slurry

TDI

- liquids reach the distributor very quickly (4 slopes cell + higher mean slope of hoses)
- no possibility of mixing

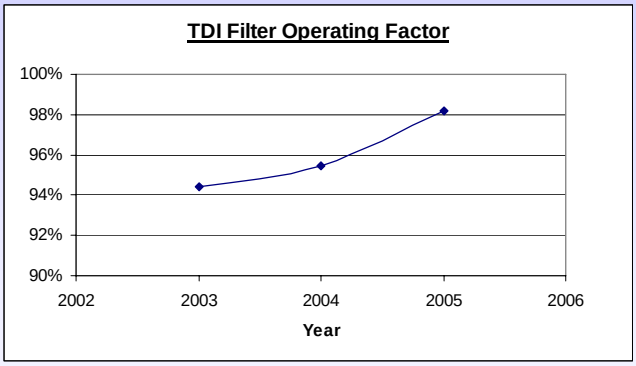
⇨ Practically zero dilution of product acid

PRAYON

Realizations

TDI 24-75 m² at PFI, Kavala

- On-stream factor* since start-up (2003)



* 100% - loss of time due to unforeseen shutdowns caused by TDI filter divided by available time (weekly maintenance excluded) (Source: PFI, Kavala)

SINCE 2003

- Sales:
  - 2 TDI 24-75 m²
  - 2 TDI 24-90 m²
- Studied models
  - TDI 24-110 m²
  - TDI 24-120 m²
  - TDI 24-130 m²

PRAYON

Applications

OTHER FIELDS OF APPLICATIONS

- Industry or processes
  - requiring a high washing efficiency

  and/or

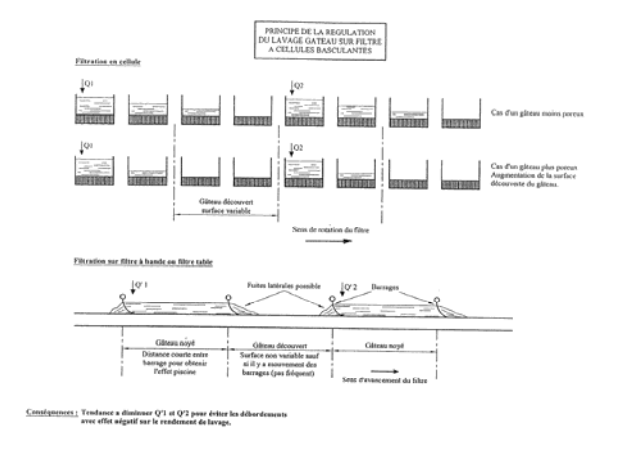
  - producing great flow of high solids content (very thick cakes)

⇨ potash, activated carbon …

PRAYON

Thank You !

BATCH FILTRATION



POWER CONSUMPTION

	Classical TP	Table Filter	TDI Filter	Belt Filter
Active surface (m²)	240	236	90	90
Spraying pump (kW)	9	160	5,5	5,5
Driving motor (kW)	30	22	7,5	37
Blowing and drying fans	2 x 3,7		2 x 2,2	
Cake Screw (kW)		37		
TOTAL (kW)	46,4	219	17,4	42,5
Power / m²	0,193	0,928	0,193	0,472