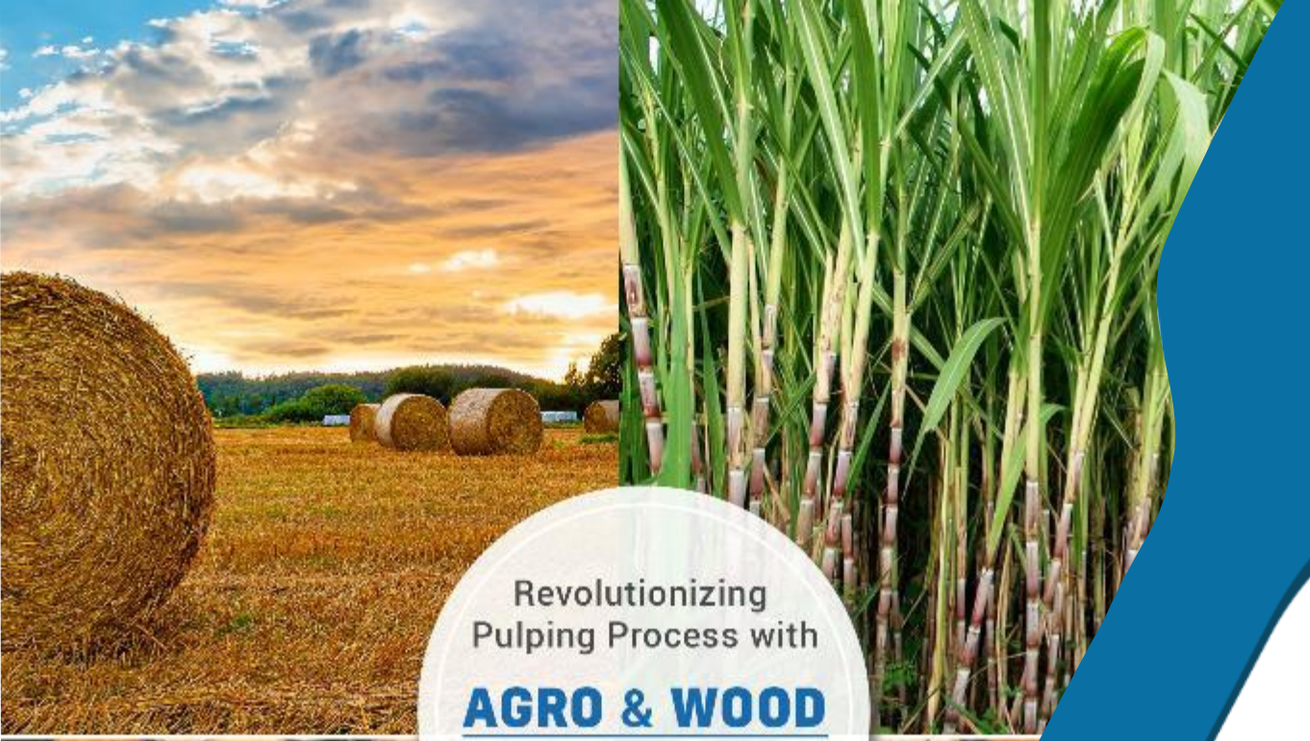


DESARADA

PARASON

Engineered Trust

"REVENUE GENERATION FROM SUGAR MILL WASTE: BAGASSE AND PRESS MUD"

Presentation by

RAJ KUMAR

Vice President

Projects

Types Of Agro Raw Material

PARASON

BAGASSE

WHEAT STRAW

SARKANDA

RICE STRAW

Pulp Production from Sugar Mill Bagasse

PARASON

For Example in a sugar mill daily Cane crushing is appx 20,000 MT/Day.

- Cane Crushing : 20000 MT/Day
- Nos. of day of operation in year : 150 Days
- Sugar production : 10-12 % of Cane Crushing
- Bagasse production : 30 % of cane crushing = 6000 MT/Day
- Press Mud generation : 4 % of Cane crushing = 800 MT/Day

Total Bagasse available = 6000 MT/Day x 150 days = **9,00,000** MT/Year (365 days)
And out of which 90 % may use as fuel in the power boiler = 900000 x 90 % = 810000 MT,
Rest available bagasse for pulp making is = 900000-810000= 90000 MT/Year (365 days)

So Bagasse for pulp production = **90,000** MT/Year (365 days) @ 50 % moisture and 30 % pith.

Requirement of Bagasse/MT Bleached Pulp = **5** MT/MT Pulp
= 90000/5 = 18000 MT Bleached pulp can be produced =
considering 330 working days of the pulp plant = 18000/330 = **55** MT/Day

Say = **50** MT/Day pulp production.

Bleached and unbleached Pulp

Un- Bleached Pulp

Bleached Pulp

CNG Production from Press Mud

PARASON

Assume Cane Crushing: 20000 MT/Day

Nos. of day of operation in year : 150 Days

Sugar production : 10-12 % of Cane Crushing

Bagasse production : 30 % of cane crushing = 6000 MT/Day

Press Mud generation : 4 % of Cane crushing = 800 MT/Day

Total Press mud generation will be = 800x150 days = 120000 MT/Year (in 150 operating days of sugar mills, which shall be available for 365 days)

Press Mud availability for BioCNG plant = 120000 MT/year (365 days)

Considering running days = 330 days

= 120000/330 = **364** MT equivalent to **350** MT/Day (with 25-30 % TS, 75 % VS),

With 350 MT per day press mud, we can produce **12.5-13 MT BioCNG** per day

And along with BioCNG, Solid Fertilizer (Without PROM) – 30 MT/Day

PROM = **80-85** MT/Day

Liquid Fertilizer = **150** KL/Day

These all will give extra revenue apart from BioCNG to be sold in open market as Organic Fertilizer.

The Raw Bio Gas has end uses:

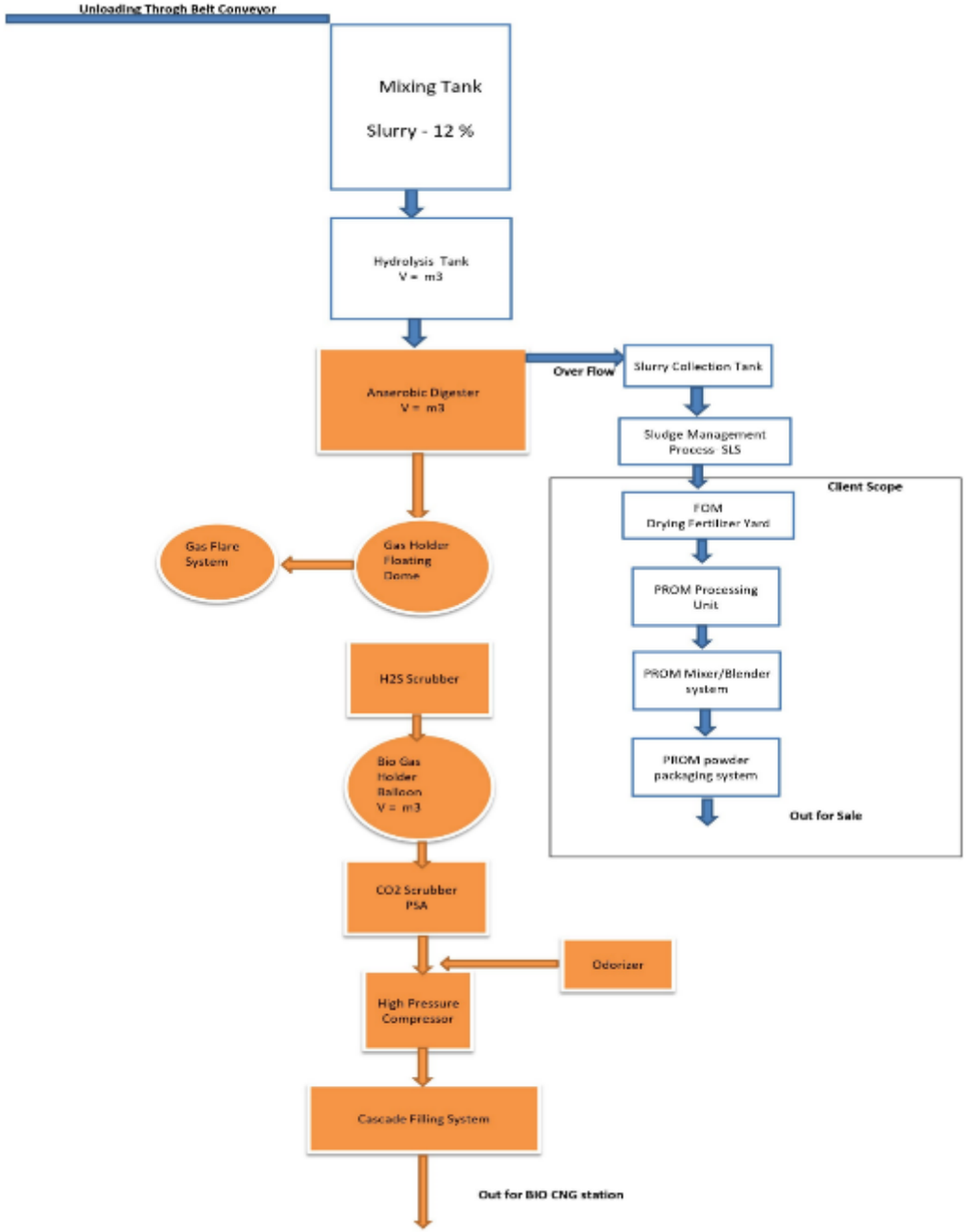
a) Use as fuel in Power **Boiler (as GCV is around 5000 K Cal/Kg)**

b) To use as fuel for Gas generator to produce **Electricity. (GCV 5000 K Cal/Kg)**

c) BioCNG will be utilized as fuel in automobiles such as auto-rickshaws, cars, trucks, buses, etc. This approach is more profitable compared to power generation and contributes to a reduction in pollution load. **(GCV 9000-10000 Kcal/kg)**

Process Diagram from Press mud to Bio CNG Production

PARASON



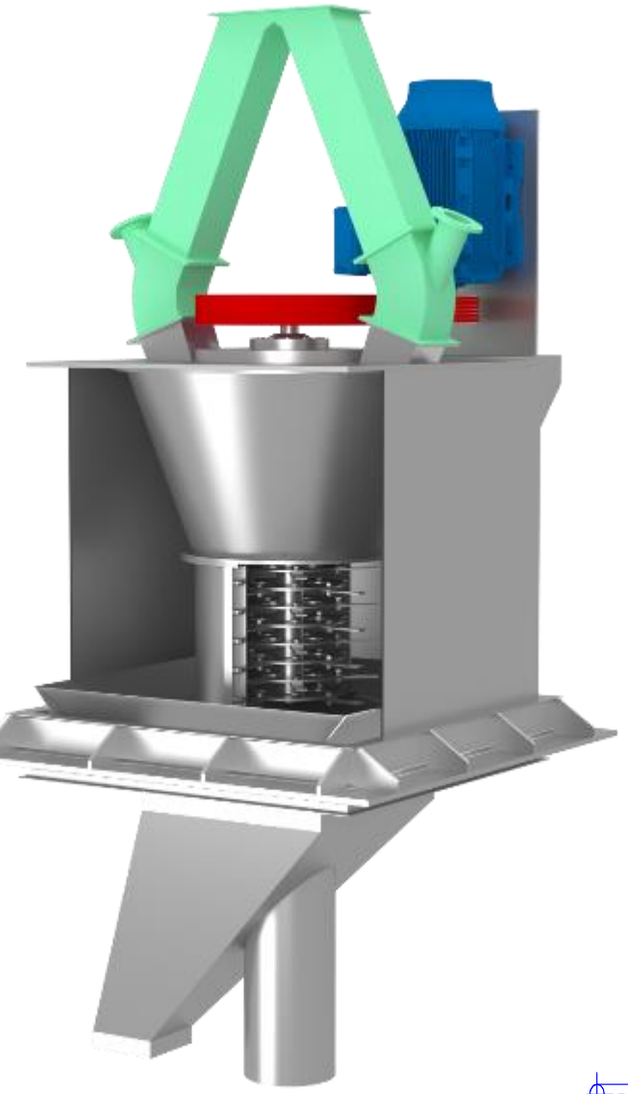
Equipment List

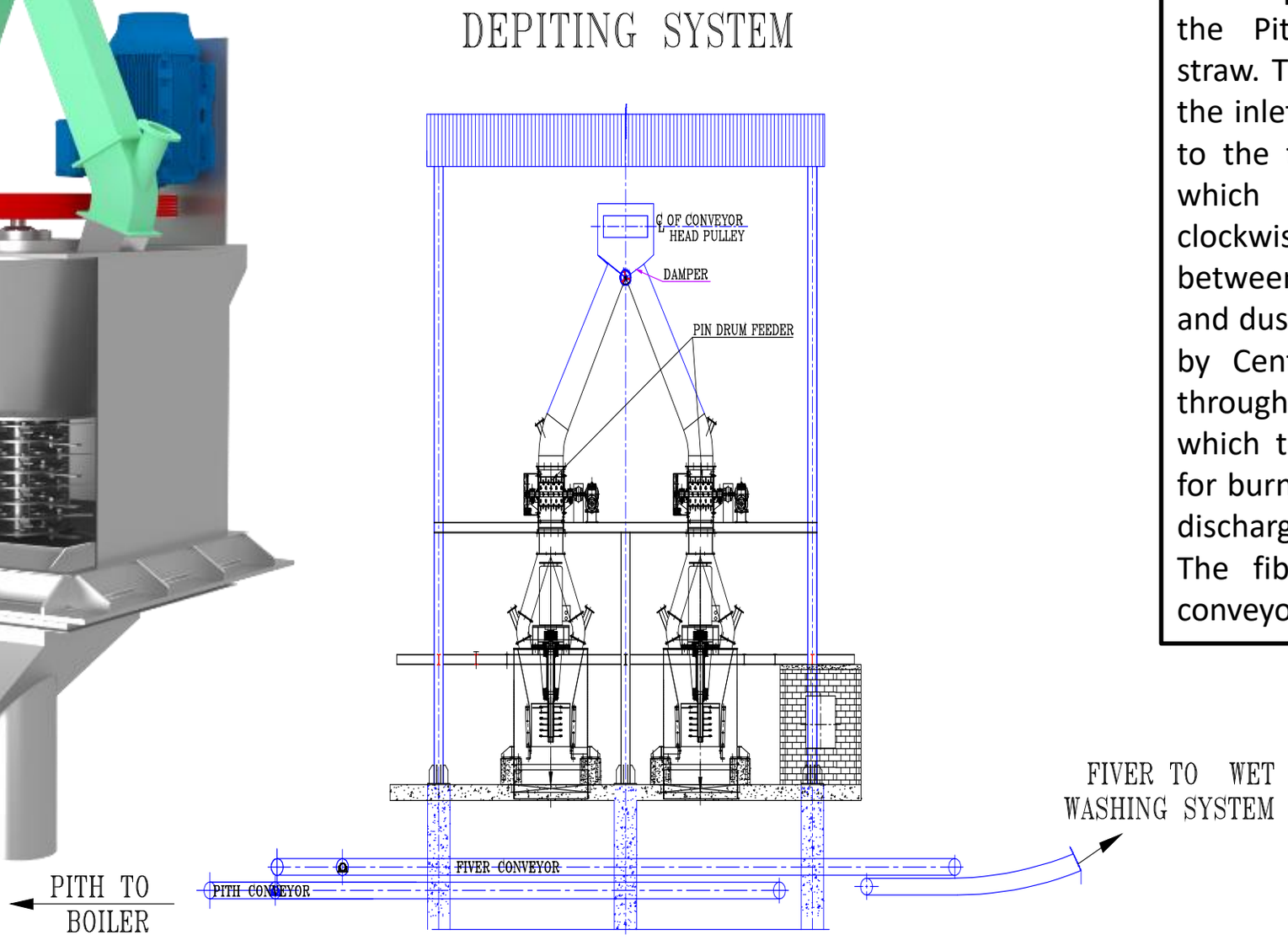
PARASON

Dry Depithing / Dedusting	Wet Washing System	Continuous Digester System	Brown Washing System	Screening System	Centricleaning System	ODL(Oxygen Delignification)	Bleaching System:-ECF (Elemental Chlorine Free) D0 Eop D1
Pin Drum Feeder	Pulper	Cross Screw Conveyor	Johnson Knotter Screen/Knotter	Three Stage Pressure Screening	Four Stage Centri Cleaning System	Heater Mixer	Washer - 3 Nos. D0, E0p, D1 (MOC SS 317L/SS 904L/SMO 254)
Depither	Twin Turbo Washer	Pin Drum Feeder	Brown Stock Washer – 3 /4 stages	Primary Pressure Screen	Primary Centricleaning	Stand pipe	Heater Mixer - 3
Bezner Screen	Aqua Separator	Metric Screw Conveyor	Shredder Repulper – 2	Secondary Pressure Screen	Secondary Centricleaners	MC pump	MC Pump - 3
	Screw Press	Plug Screw Feeder	Final Conveyor	Tertiary Pressure Screen	Tertiary Centricleaners	O2 Mixer	ClO2 Mixer -2
	B-2 Thickener	Digester Tubes – 2	Foam Breaker	Johnson Screen	Fourth Stage Centricleaner	O2 Reactor	O2 Mixer -1
	Clarifier	Cold Blow Discharger	Maloni Filter/Pressure Filer		Fiber Miser	O2 Blow tank with Agitator	Tower Scrapper – 3
	Screw Press/ Belt Press	Blow Tank with agitator	Decker thickener			ODL Washer – 2	Final Conveyor – 3
			Final Conveyor			Shredder Repulper	Bleached HD Tower
			Unbleached HD			Final Conveyor	

FIBRE PREPARATION

PARASON

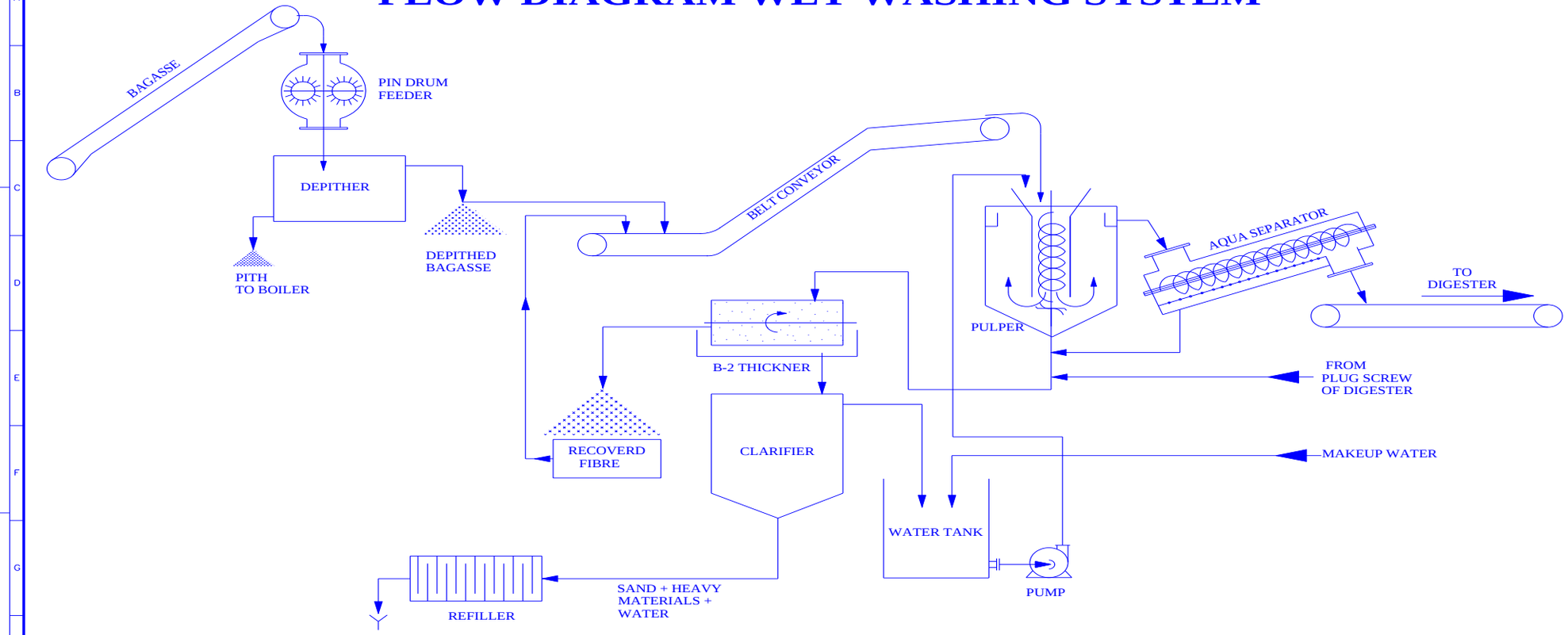




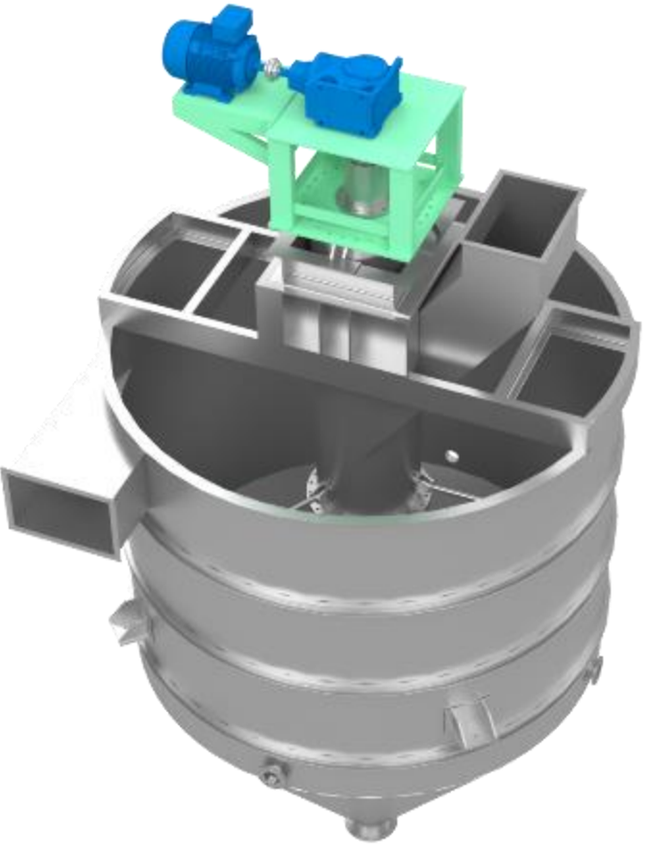
The Depither is designed to separate the Pith/dust from Bagasse/Wheat straw. The raw material is fed through the inlet hopper at a specific feed rate to the top of the Rotor Assembly in which the Hammers are rotating clockwise. The material falling down between the Rotor Hammers. The pith and dust is then forced through Screen by Centrifugal force and discharged through dust chute to a conveyor, which takes the dust either to boiler for burning or for disposal. The fiber is discharged through the fiber chute. The fiber is then taken to a belt conveyor to washing street.

Flow Diagram of Wet Washing System

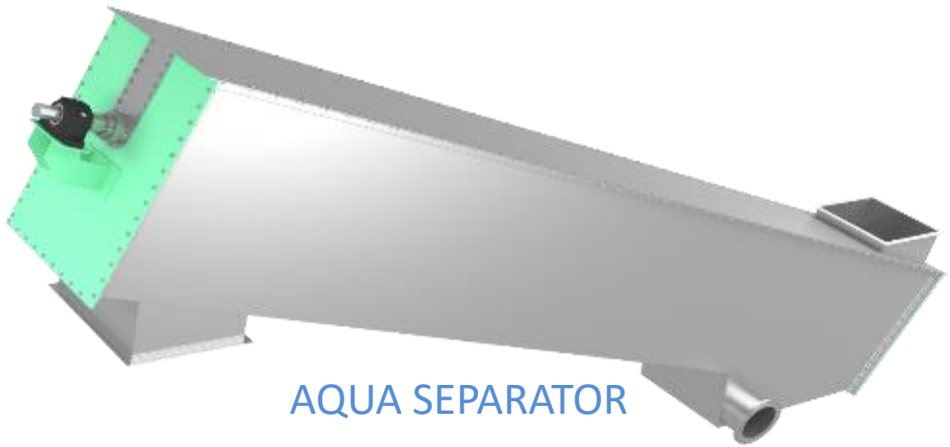
PARASON



Wet Washing System With Pulper



PULPER

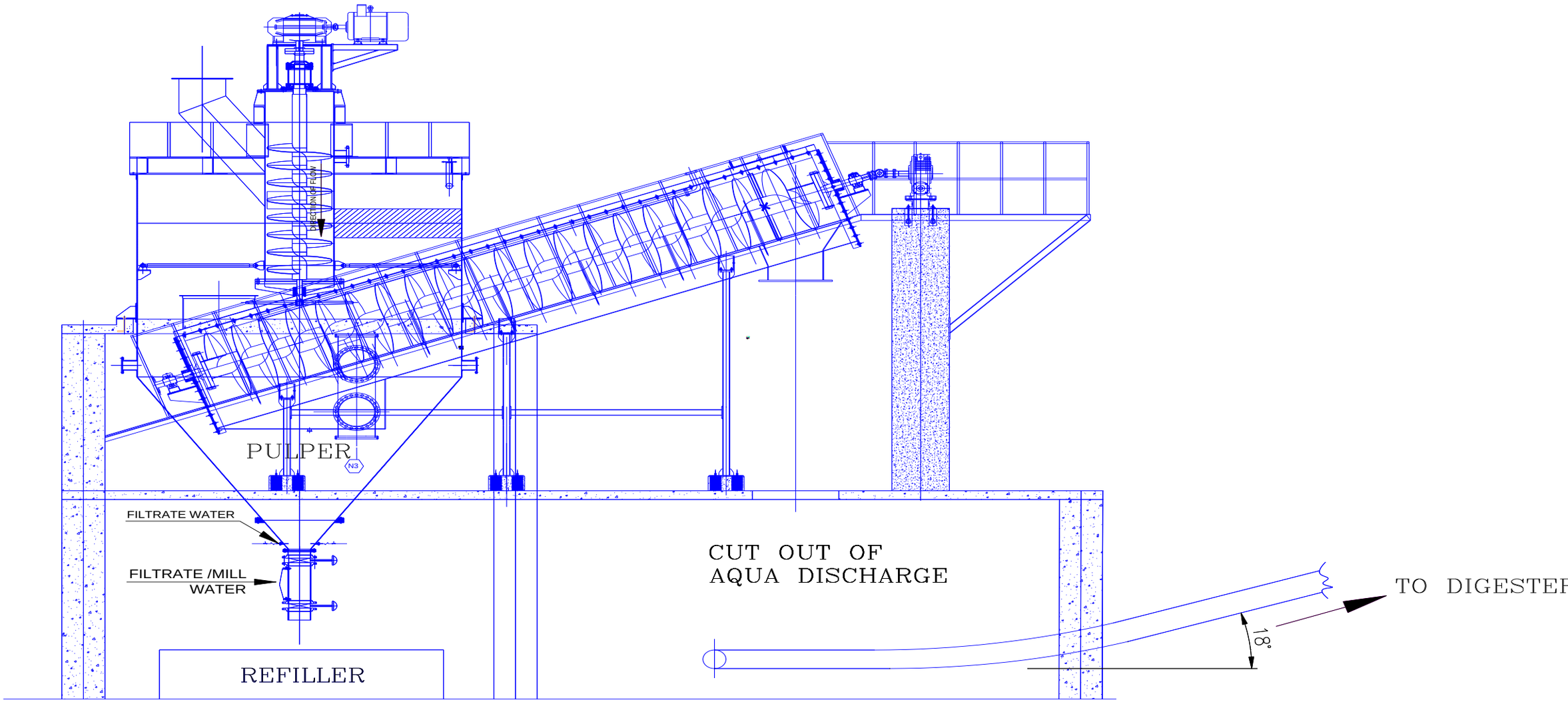


AQUA SEPARATOR

The Dry depithed bagasse/Wheat Straw is fed to the pulper where it is diluted with water to a consistency of 20 – 2.5 % with the high agitation of the pulper rotor, the dirt & pith is loosened, so that-they can be removed in the aqua separator. The Pulper is designed depending on the capacity of the plant.

The Aqua Separator consists of an inclined conveying screw of special design with screw flight in SS 304. The outlet consistency from the aqua separator is around 18-20 %.

Wet Washing System With Pulper

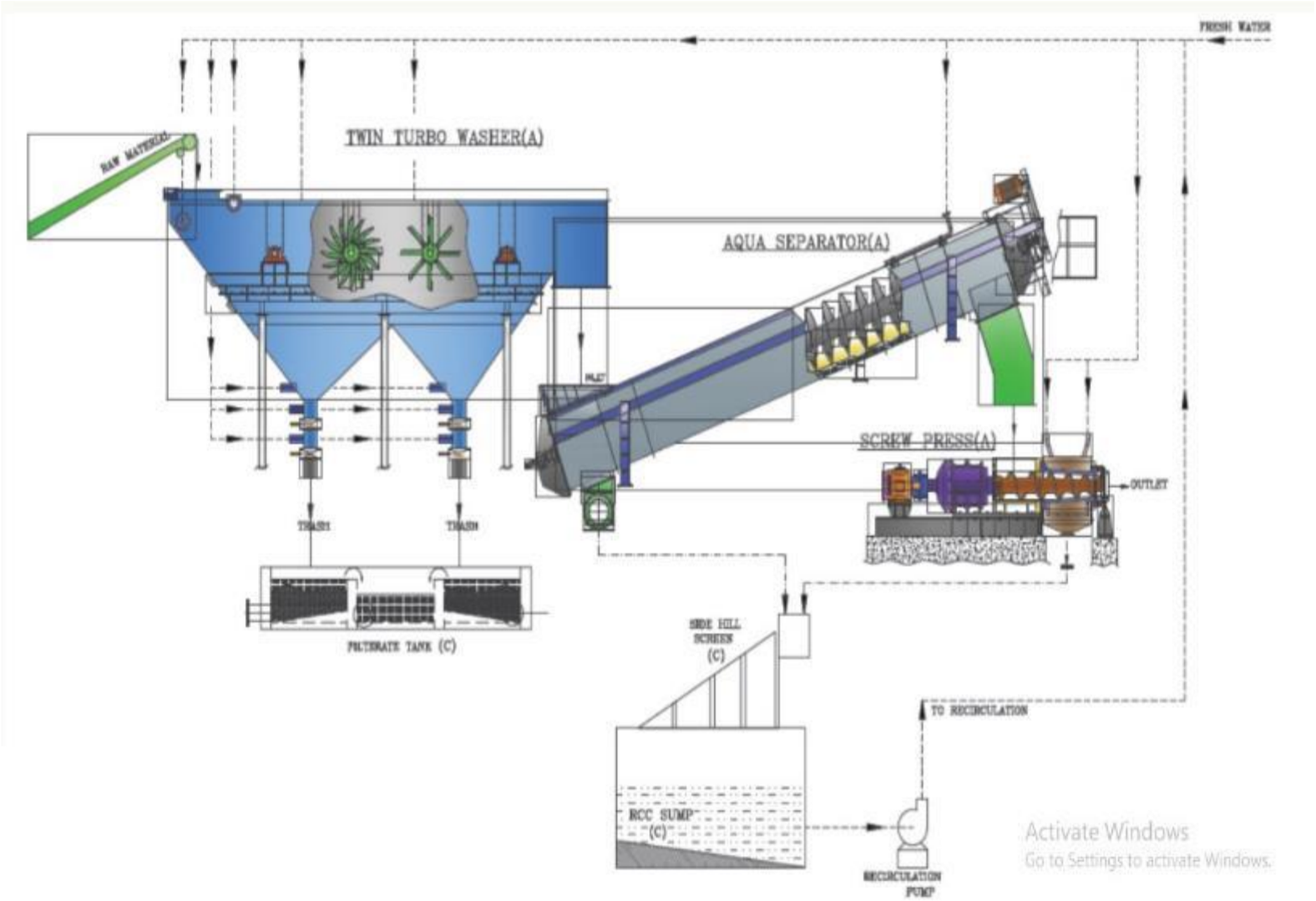


Wet Washing System With Twin Turbo Washer

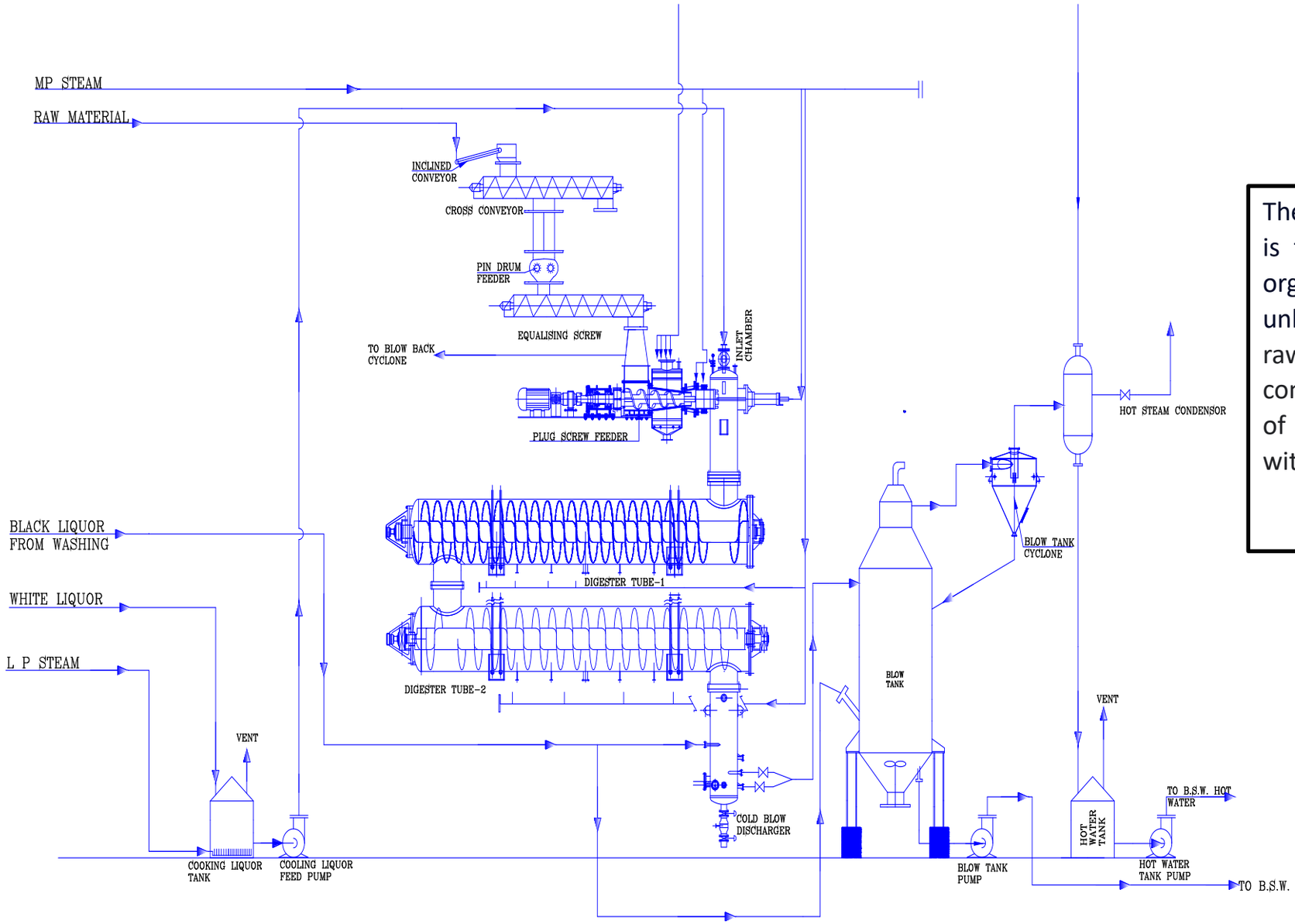
PARASON

- After dry Depithing/Dedusting, material is processed for washing with water in wet washing system. It removes dust/Pith from raw material.

- Efficiently removes foreign substances, including sand, pith, mud, stones, silica, etc.



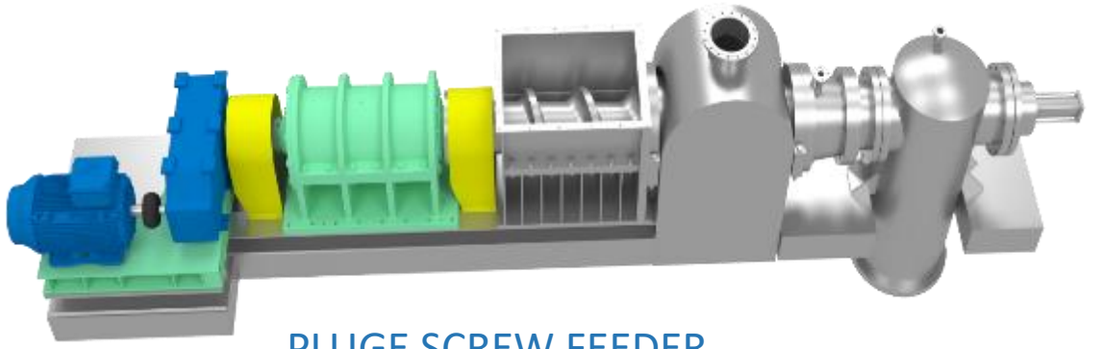
Cooking: Continuous Digester System



The purpose of cooking the agro raw material is to chemically dissolve the lignin & other organic compounds in order to obtain unbleached pulp. The cooking of agro based raw material is carried out in horizontal continuous Tube Digesters at the temperature of 160 Deg C and we get the cooked pulp within 18-22 minutes.

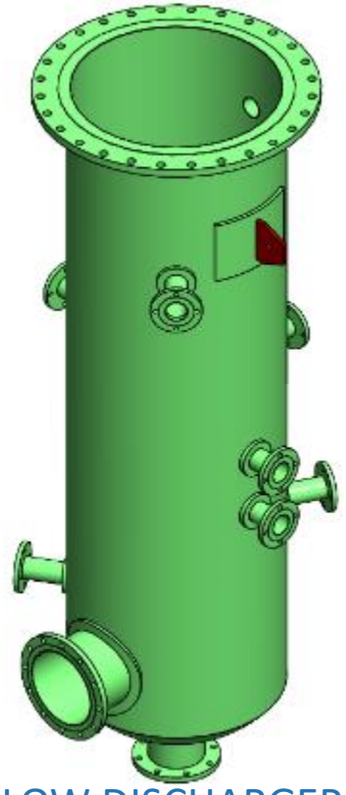
Cooking: Continuous Digester System

EQUALISING SCREW CONVEYOR



PLUGE SCREW FEEDER

DIGESTER TUBE

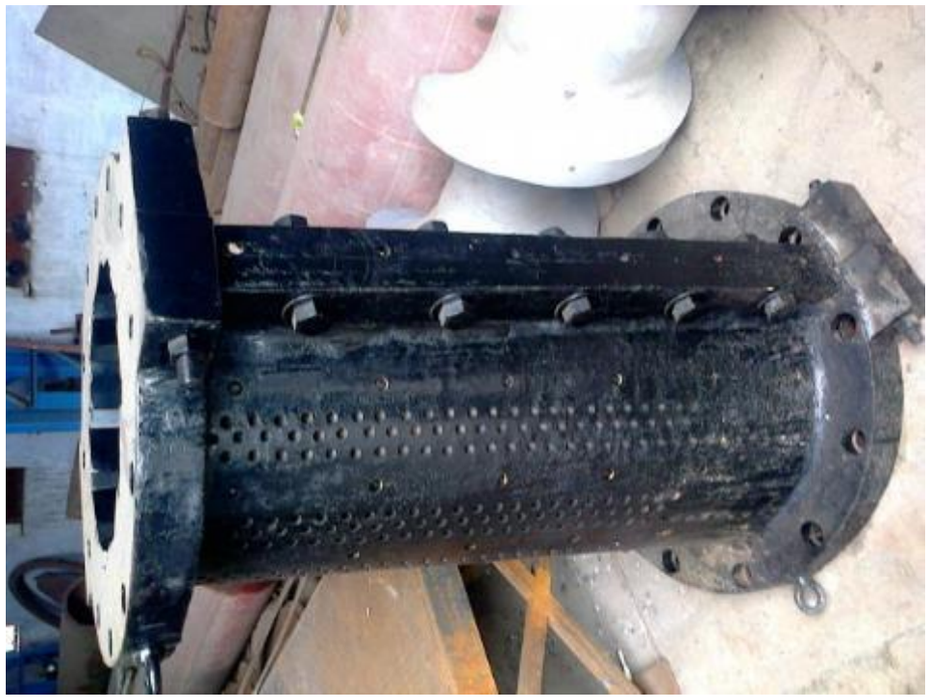


COLD BLOW DISCHARGER

Spares

- Essential spares for smooth operation of digester are Plug Screw & Throat, which has to be changed after every 800-900 hrs. operations.

Plug Screw



Throat

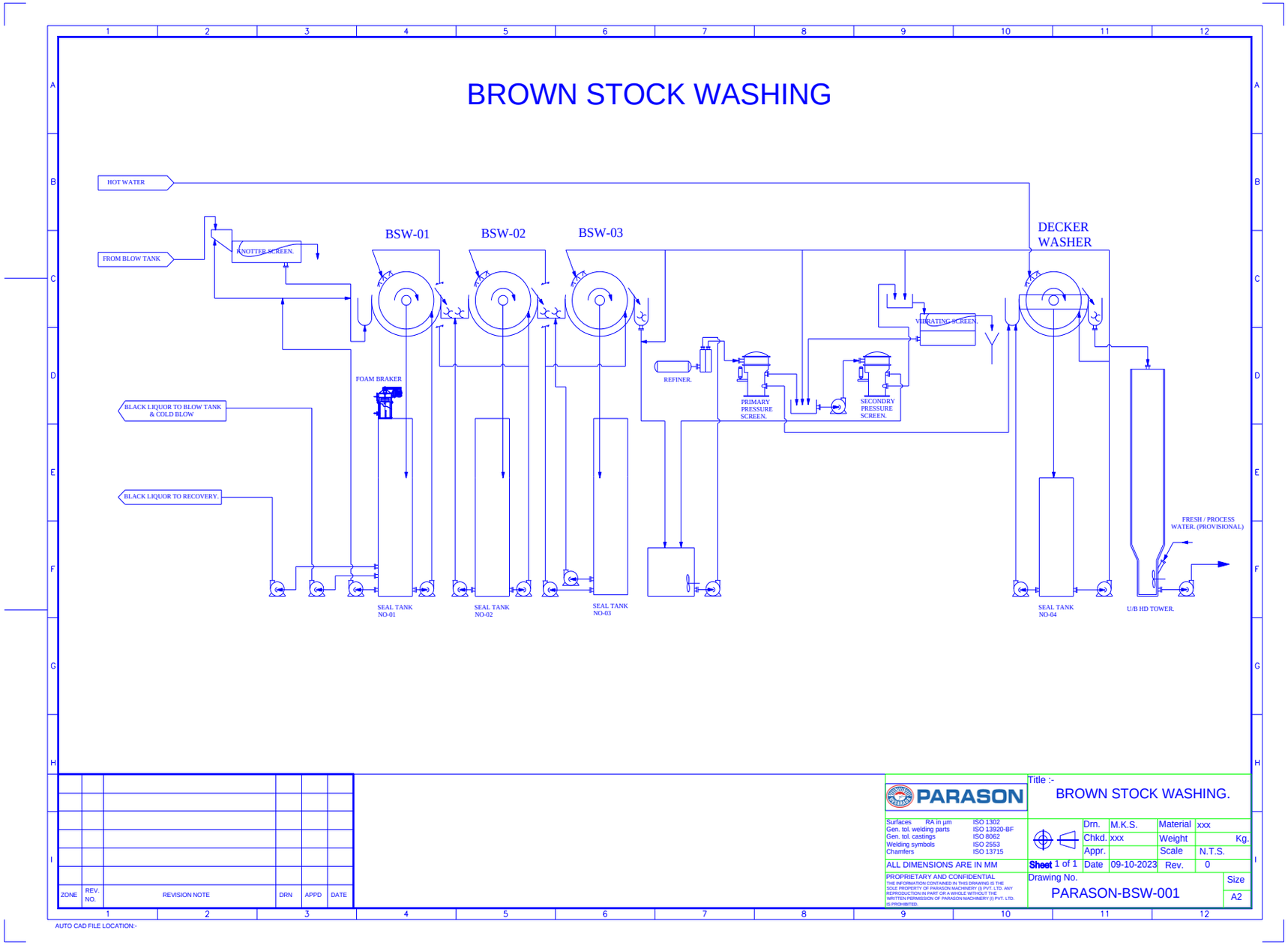
AGITATOR

PARASON

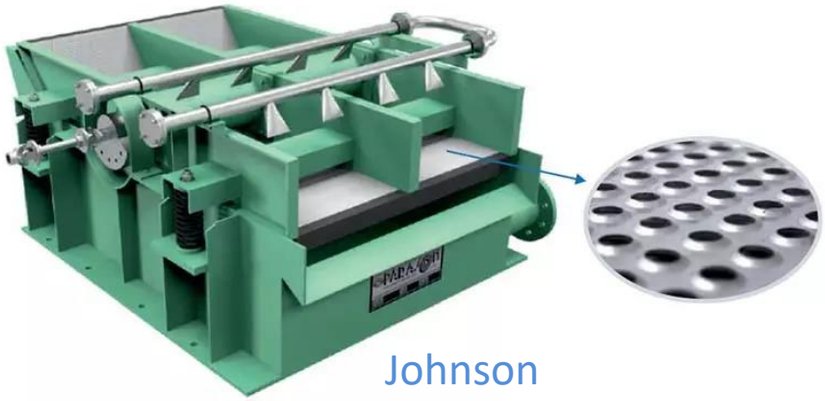
- Effective agitation at low power consumption.
- All wetted parts are of stainless steel.
- Propeller is equipped with adjustable blades.
- optimized blade design.
- Easy & low maintenance.
- High efficiency propeller Design is used to maximize agitation and have been designed for use with all types of stock with Optimum power consumption
- Bearings are accessible from outside hence can be replaced without draining the chest

BROWN STOCK WASHING SYSTEM

PARASON

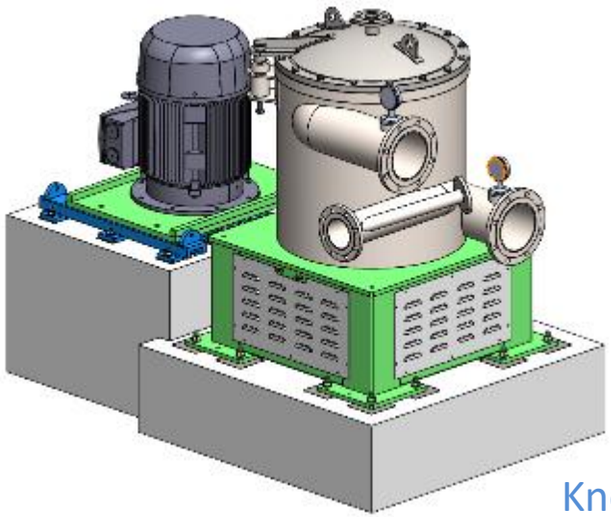


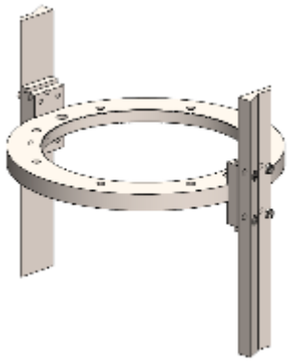
Johnson knotter/Pressure knotter



Johnson

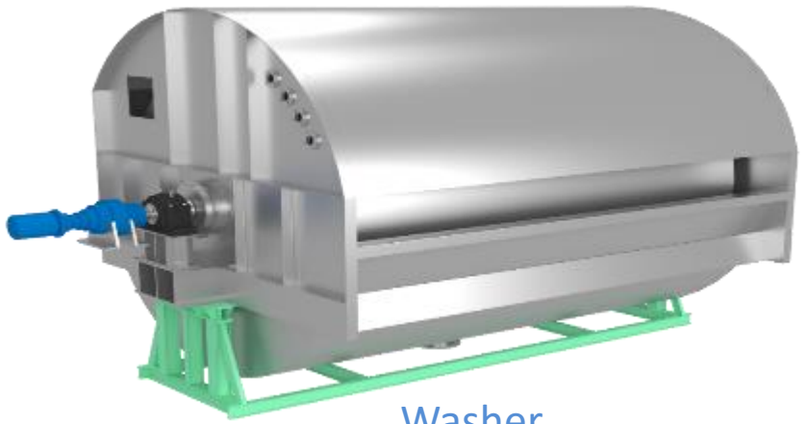
- Johnson Knotter/Pressure Knotters are required to remove the uncooked material.
- For small plants capacity under 100 MT, Vibrating knotter being used with perforation of 8 mm.
- For higher capacity we use pressure knotter as close system efficiently removes the knots.
- Knots again being reused in Digester for cooking.



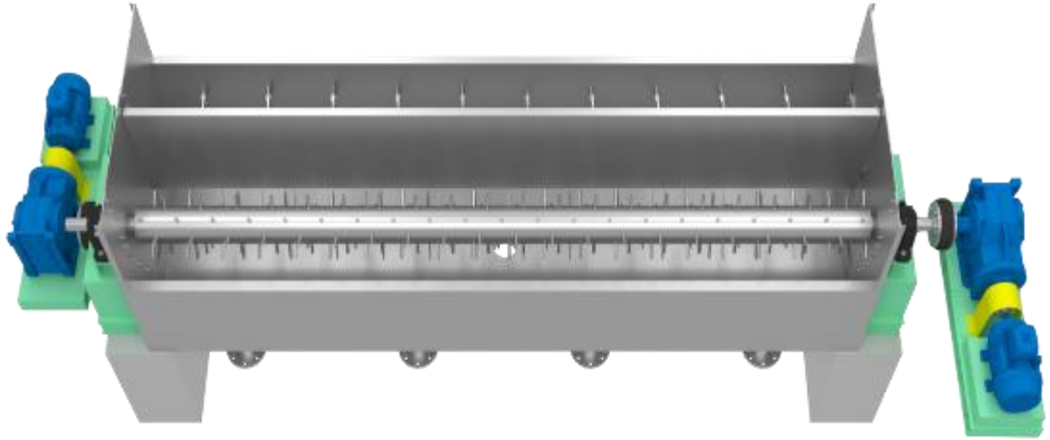


Knotter Screen

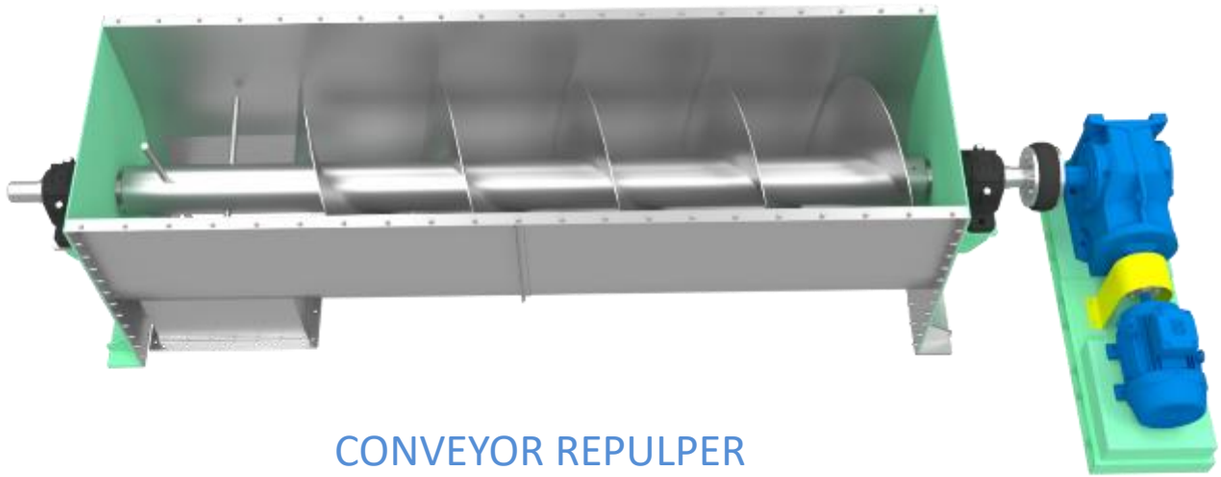
BROWN STOCK WASHING SYSTEM



Washer

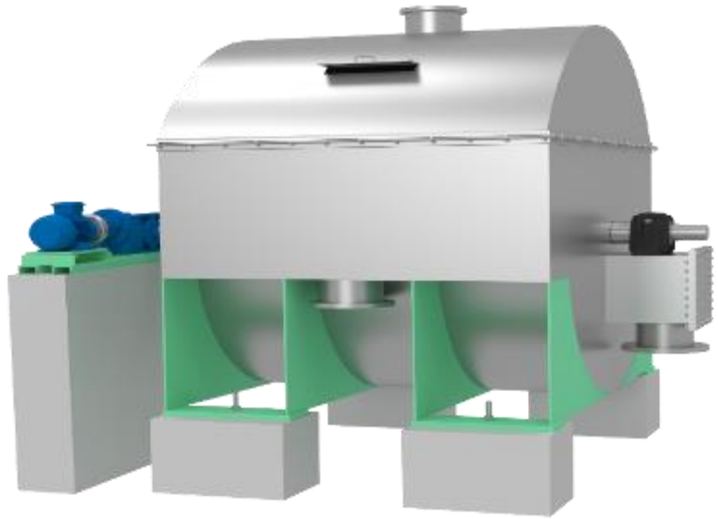


SHREDDER REPULPER



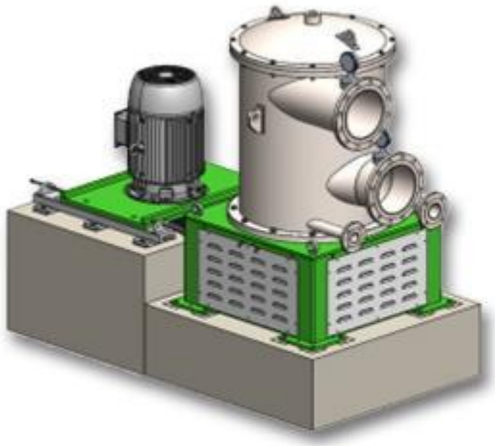
CONVEYOR REPULPER

Maloni filter/Pressure filter

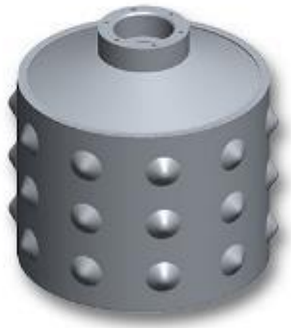


Maloni filter

•Working principle - In pulp mills, fibres in the spent liquor cause scaling in evaporators and concentrators. Recovering these fibres improves the evaporating efficiency and greatly reduces boil-out and cleaning time. The Black Liquor Filter effectively separates fibres from the spent liquor. All recovered fibre is returned to the pulping line for additional gain.
Application and unique features :-
• Fibre recovered.
•Operates at low rpm.
•Trouble free operation



Pressure Filter



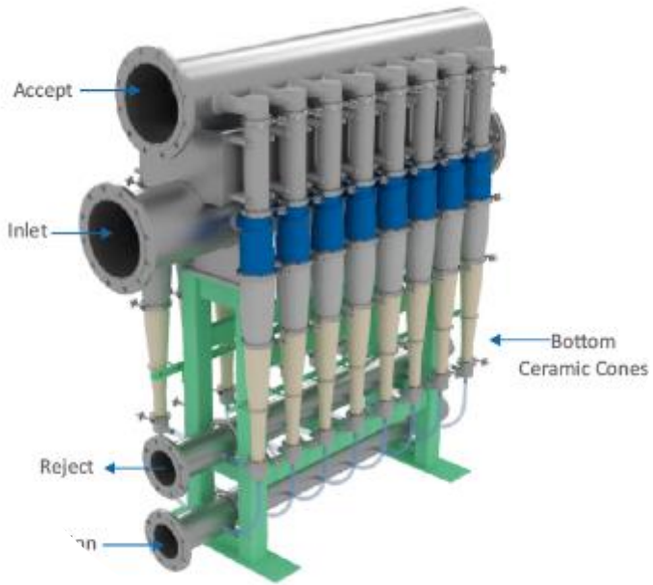
Screening- 3 Stage

Tertiary Pressure Screen | Secondary Pressure Screen | Primary Pressure Screen

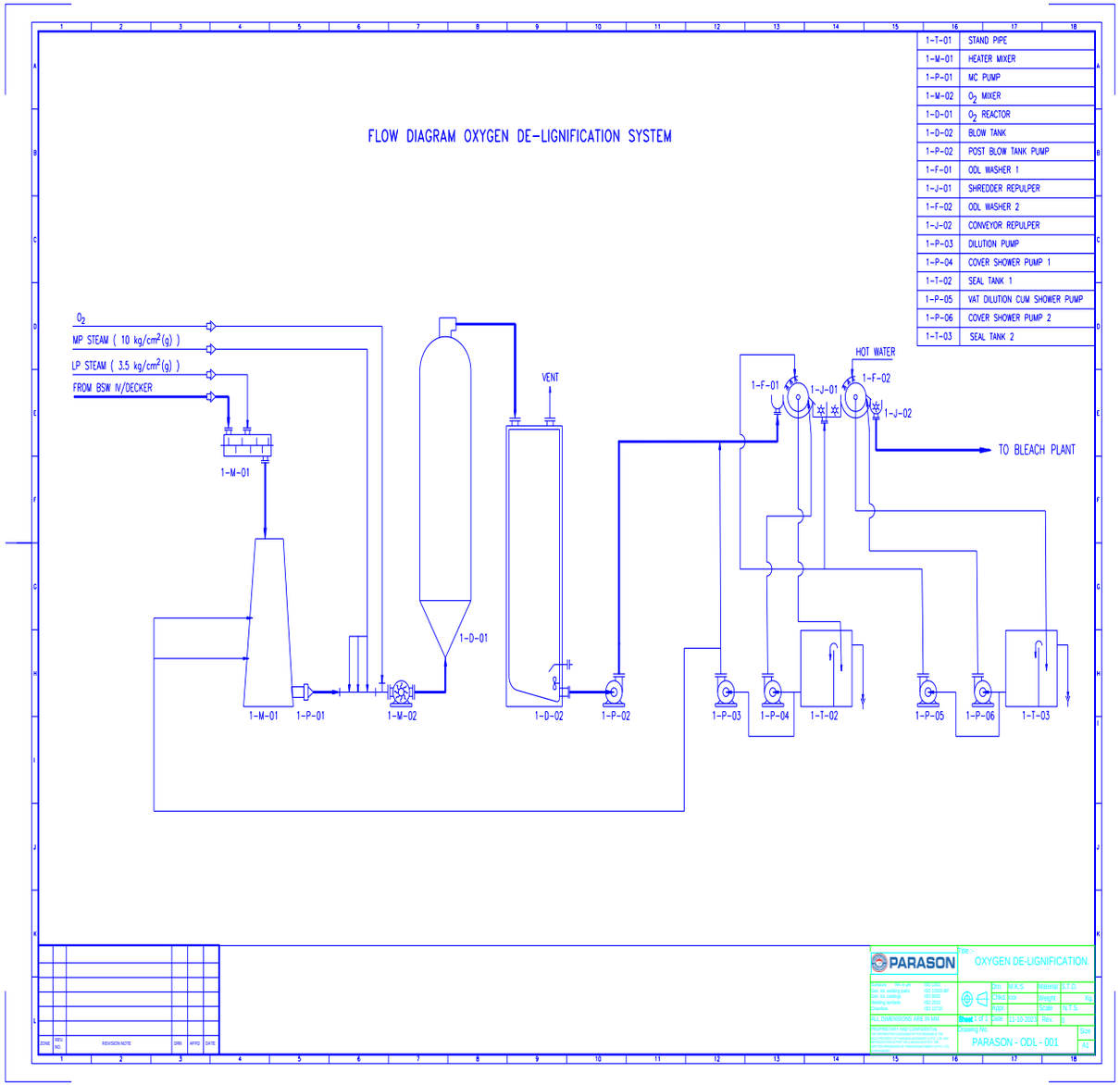
- High efficient screening system with lower power consumption.
- Working Consistency range - 2.5 -3 %
- Slot Size range - 0.18 to 0.25 mm
- Advanced structure, durable, convenient disassembly and assembly, simple operation, less malfunctions for continuous working, low maintenance cost.

Centricleaning:- 4 Stage

- Efficient removal of impurities like dirt, shives, specks, and light particles.
- High wear resistance construction, bottom ceramic cone.
- The small cone diameter resulting in outstanding cleaning efficiency.
- Working Consistency range from 0.8 to 1 % for better performance.



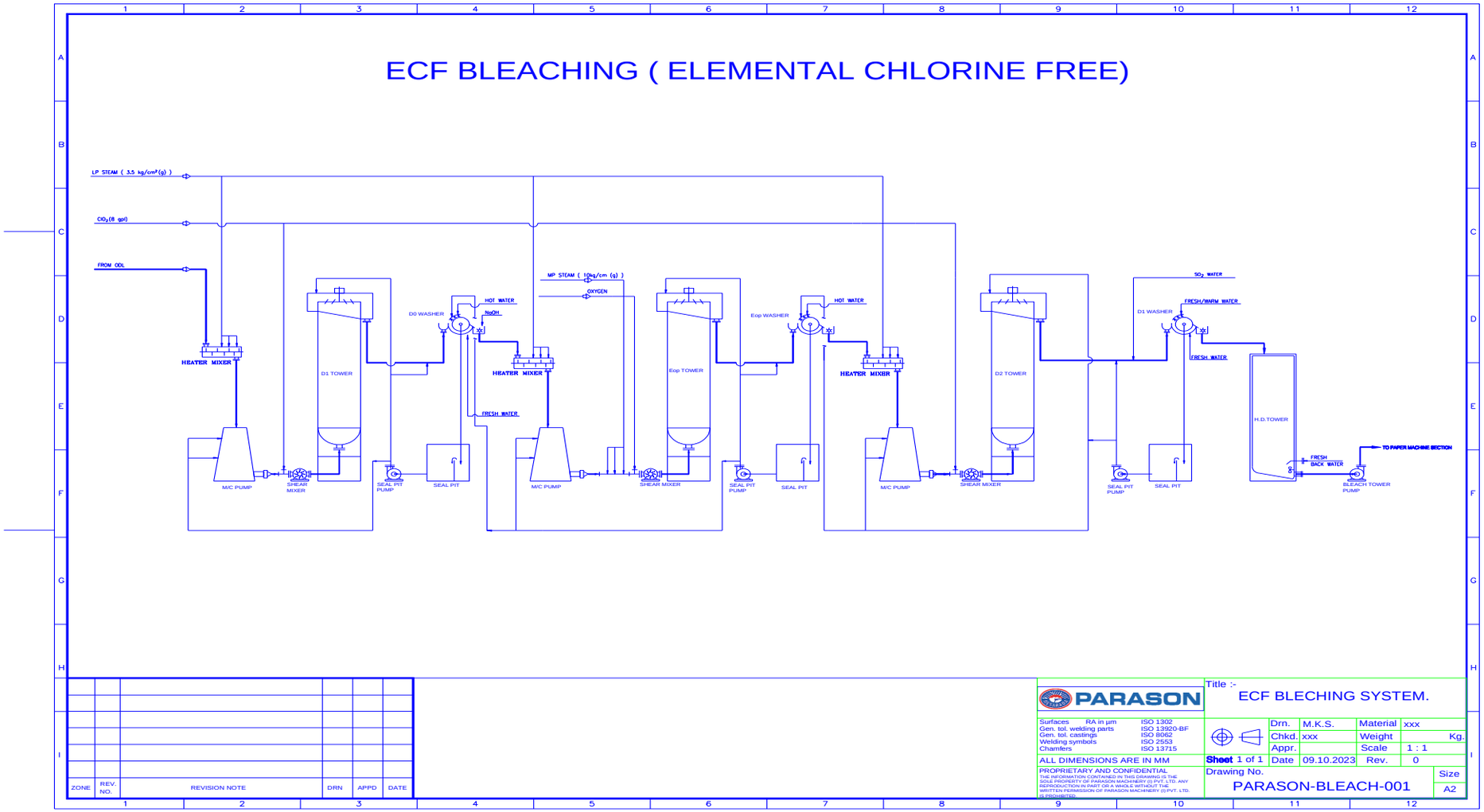
ODL (OXYGEN DE-LIGNIFICATION) SYSTEM



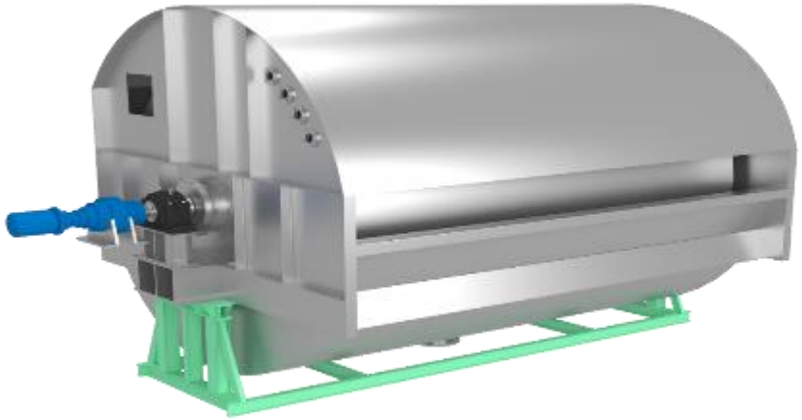
In Oxygen delignification stage, further we reduce the Kappa number with the help of O2 and NaOH at high temperature which help us reduction in Kappa number by 25-30 %, which further help us reduction in Bleaching chemicals by 25-30 % and less load on ETP.

Conditions for oxygen delignification
Pulp consistency 10-12 %
Retention time: 60 min
Temperature: 95-100 Deg C
Pressure: 3 to 6 Kg/cm2
NaOH: 15-20 kg/ton
pH value: above 10
Oxygen consumption: 15-20 kg/ton

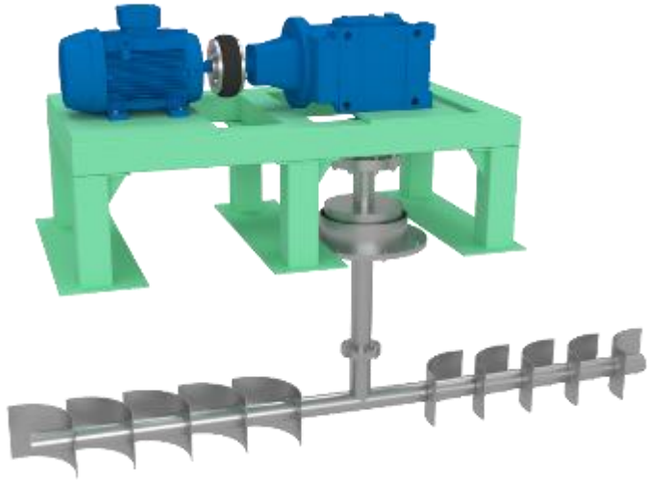
ECF Bleaching Sequence D0 Eop D1 (Elemental Chlorine Free)



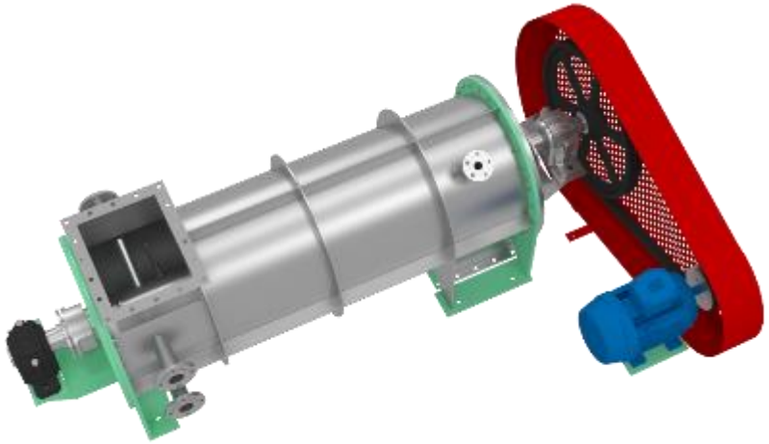
ECF Bleaching Sequence D0 Eop D1 (Elemental Chlorine Free)



Washer in MOC SS 316L, 317L, 904L & SMO 254



TOWER TOP SCRAPER



HEATER MIXER

CONVEYOR REPULPER

Agro Pulping Cooking and Washing conditions

PARASON

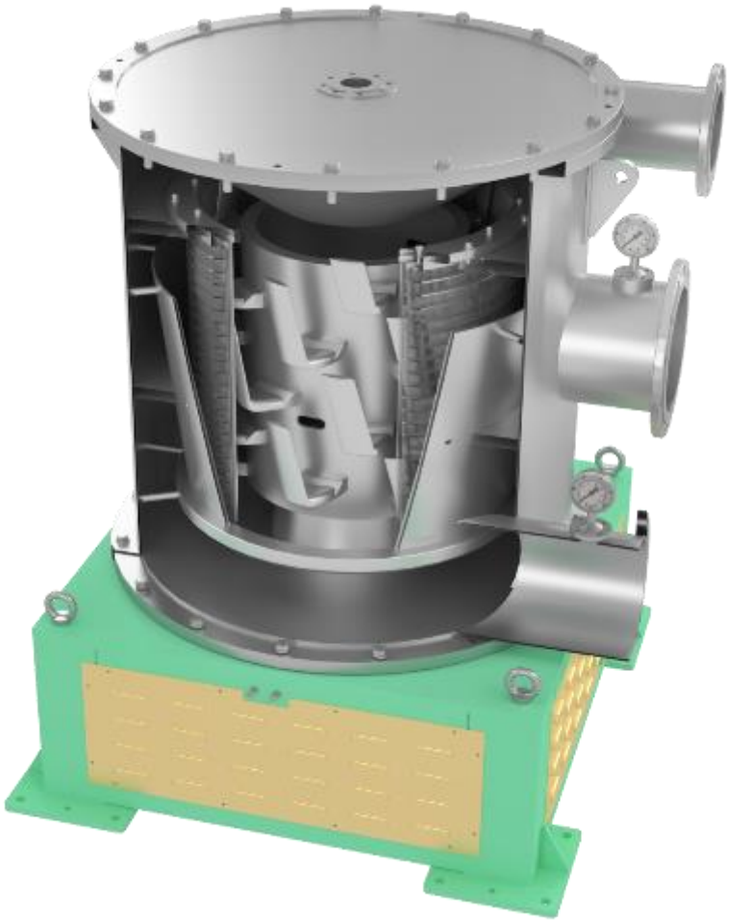
S. No.	PARTICULARS	Continuous Digester	Brown Stock Washing	ODL	Eop
1	Cooking Time (minutes)	18-22	-		
2	NaOH consumption (Kg/MT Pulp)	300-350	-		
3	Steam Consumption (MT/MT Pulp)	1.5-1.6	-	0.30-0.35	0.25-0.30
4	Kappa Number	13-14	-	9-10	2-2.2
5	Soda Loss (Kg/MT Pulp)	-	-	15-20	-
6	WBL (m3/MT Pulp)	-	10-11	-	-
7	RAA (gpl)	4.5-5.5	-	-	-

Agro Pulping ODL and Bleaching parameters

PARASON

S. No.	PARTICULARS	ODL REACTOR	DO	EOP	D1
1	Retention (Minutes)	60	60	90	150-180
2	Consistency (%)	10	10	10	10
3	Temperature (Deg C)	90-95	70-75	70-75	75-80
4	pH	9.5-10.5	2.8-3.0	10.0-10.5	2.8-3.2
5	NaOH consumption (Kg/MT Pulp)	10-15	-	15-20	-
6	O2 consumption (Kg/MT Pulp)	15-20	-	5-7	-
7	ClO2 consumption (Kg/MT Pulp)	-	12-13	-	6-7
8	H2O2 Consumption (Kg/MT Pulp)	-	-	8-10	-
9	SO2 Consumption (Kg/MT Pulp)	-	-	-	1
10	Brightness (deg ISO)	40-45	55-60	70-75	84-85
11	Pulp Properties				Tear 58-60 BL 588-6000 oSR 23-24 Viscosity 9.5-10.5 Ash 1.3-1.5 %

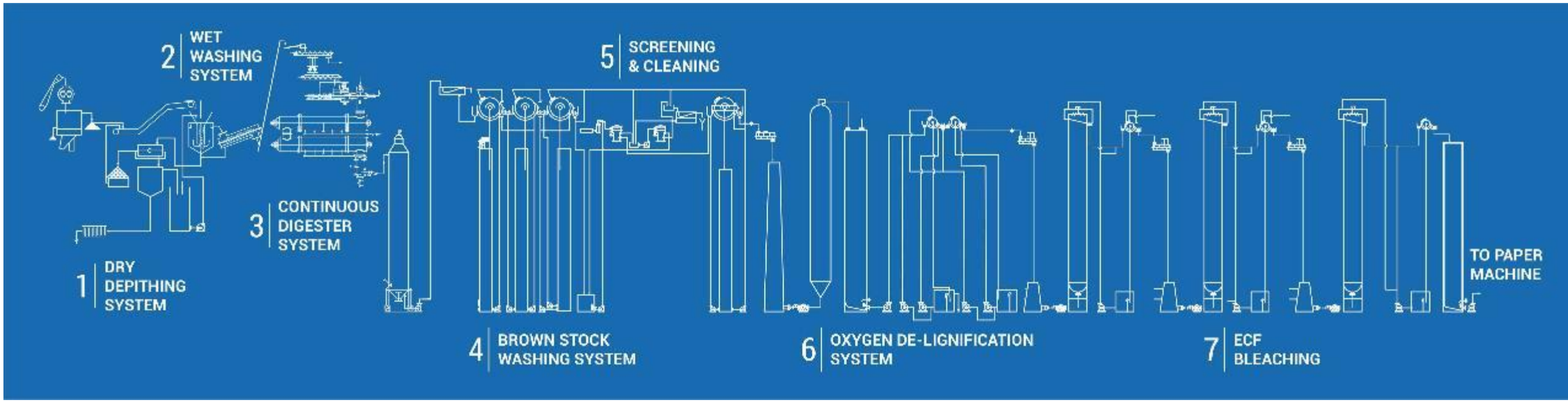
Fractionator



- To segregate the long fiber and short fiber
- Long fiber may be further pass through refiner.
- Short fiber directly forward to mixing chest.
- Long fiber mix together with short fiber after refining.
- Optimization of refining power consumption.
- Improvement in machine runnability.

Conclusion

Advanced solutions presented are designed to be cost-optimized, energy-efficient, and low-maintenance, all while significantly improving productivity. By incorporating cutting-edge technologies like fiber separation, continuous digesters, Brown Stock Washing, Screening & Cleaning, ODL systems, and ECF bleaching, agro-based pulp mills can achieve greater efficiency and sustainability, ensuring long-term success in a competitive industry.



THANK YOU

Thanks and Regards

PARASON

360 Solution Provider

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