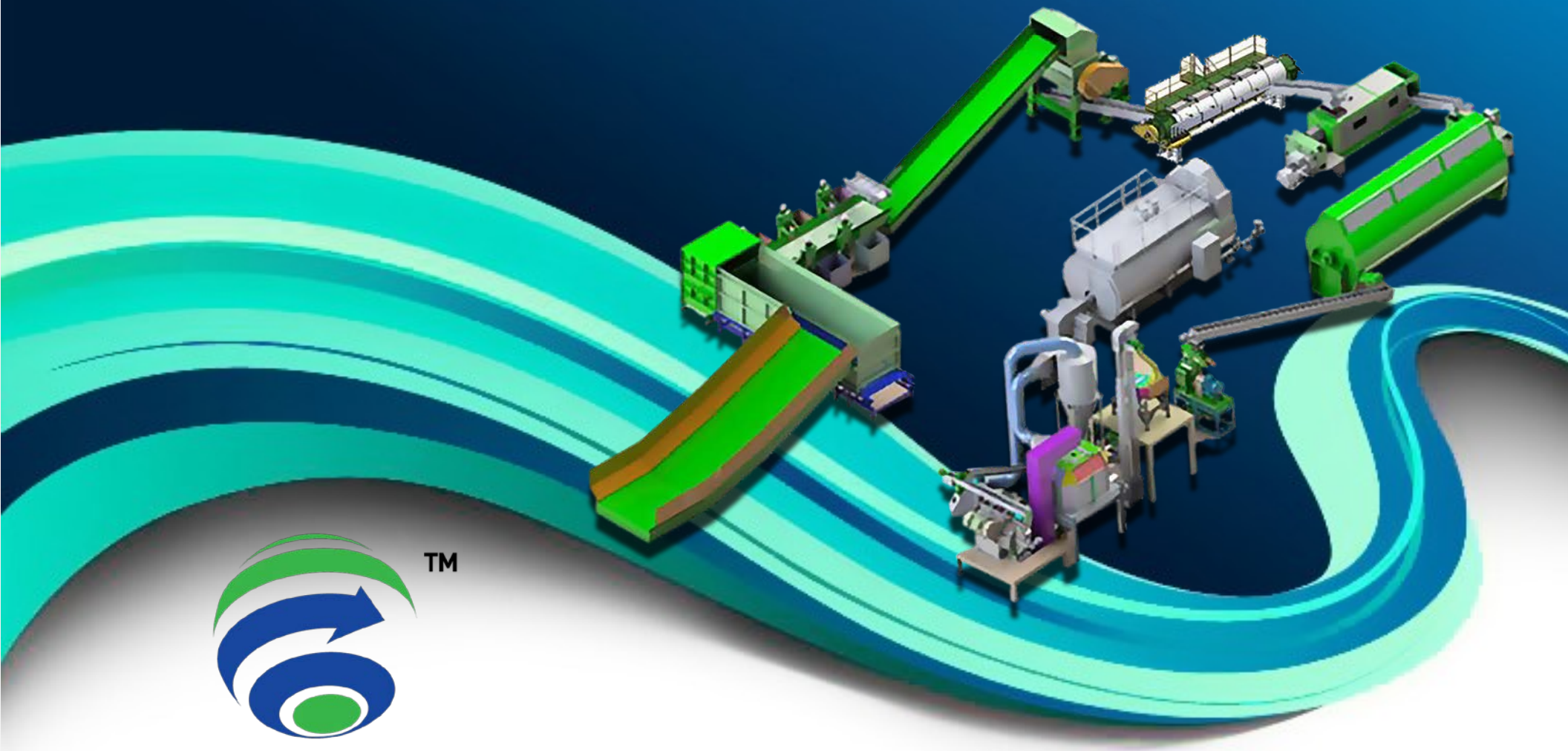
GEODYN PYROLYSIS SYSTEM

Pyro Oil - SynGas – BioChar



GEODYN™
SOLUTIONS

Transforming plastics/tires to Pyro Oil – SynGas - BioChar

15 TON-PER-HOUR.

PROPOSAL SUMMARY

Input Capacity 15 tons per hour I 360 tons per day

TOTAL COST

$22,313,375.00

Estimated R.O.I.:

1.76 years

Estimated R.O.I. is based on an operation of 24 hours/day & 360 days/year
Operating cost may vary depending on the labor and fuel cost at final destination.
Excess liquids from the process will be removed through evaporation or treated to irrigation water standards.

Proposed Geodyn™ Total Waste System

		Per Set	No. of Sets		Total
Geodyn 15T Plastic/Tire Recyling	$	6,267,500.00	1	$	6,267,500.00
Storage Silos	$	86,250.00	4	$	345,000.00
7 TpH Pyroysis	$	11,307,375.00	1	$	11,307,375.00
10 Tph Fischer Tropsch	$	3,393,500.00	1	$	3,393,500.00
Shipping and Installation	$	1,000,000.00	1	$	1,000,000.00
			Total System	**$**	**22,313,375.00**

Proposed Geodyn™ Total Waste System

SUMMARY	
Tipping Fee	$00.00 per ton
Input Capacity	360 tons/day
Output Capacity	180 tons/day
Pyro Oil Market Value	$500 / tons
Bio Char Market Value	$200 / tons
Syngas Market Value	$600 / tons
System Capital Cost	$22,313,375.00
Annual Operating Cost	$821,981.66
Annual Net Profit	$12,695,298.30
Payback in	1.76 years

Proposed Geodyn™ Total Waste System Revenue

360.00	Removed liquid
-	Removed through sort prior to system processing
	Dry Product Tons = 180.00
	Average Conversion Rate = 50.00%

Total System Revenue

Annual Revenue Projections

Income Source	Tons	$ Per-ton	Days	Annual Revenue
Pyro Oil	63	$500	360	$11,340,000.00
Bio Char	18.9	$200	360	$1,360,800.00
Syngas	3.78	$600	360	$816,480.00
Irrigation Water *	45	-	360	-
Facility Tipping Fees	360	-	360	
			Annual Projected Revenue =	$13,517,280.00

- *25% of incoming liquids are treated to irrigation water standards.*
- *Note: Based on 24 hours per day, 360 days per year.*

PROPOSAL SUMMARY

Operating Cost Assumptions -180 TPD - 24 hours-day

Type	FTE	Monthly Cost	Total Cost
Laborers & Operators	24	$ 250.00	$ 6,000.00
Supervisors/Loader	4	$ 450.00	$ 1,800.00
Manager	4	$ 1,000.00	$ 4,000.00
		Total Monthly Labor Cost =	**$ 11,800.00**
		Monthly Tons =	9,000.00
		Per-Ton Cost of Labor =	**$ 1.31**

Type	Kwh	Unit Cost	Daily Cost
Electricity	8775	$ 0.1500	$ 1,316.25
		Daily Electricity Cost =	**$ 1,316.25**
		Daily Tons =	360.00
		Per-Ton Cost of Electricity =	**$ 3.66**

Type	Units	Per-Litre Cost	Daily Cost
Wheel Loader	84	$ 0.91	$ 76.44
		Total Daily Diesel Fuel Cost =	**$ 76.44**
		Daily Tons =	360.00
		Per-Ton Cost of Diesel Fuel =	**$ 0.21**
		Labor	$ 1.31
		Electricity	$ 3.66
		Fuel	$ 0.21
		Total Per-Ton Operating Costs =	**$ 5.18**
		Daily Tons =	360.00
		Total Daily Operating Costs =	**$ 1,864.69**
		15% Contingency	$ 279.70
		Total Daily Costs =	**$ 2,144.39**
		Per-Ton =	**$ 5.96**
		Annual Maintenance Cost	**$50,000**
	Annual Operating Cost =		**$ 821,981.66**

Proposed Geodyn™ Total Waste System

360 TPD Projected - 24 hours per-day - 360 days per year

		Per Set	No. of Sets		Total
Geodyn 15TPH Plastic/Tire Shredder Set	$	6,267,500.00	1	$	6,267,500.00
Storage Silos	$	86,250.00	4	$	345,000.00
7 TpH Pyroysis	$	11,307,375.00	1	$	11,307,375.00
10 Tph Fischer Tropsch	$	3,393,500.00	1	$	3,393,500.00
Shipping and Installation	$	1,000,000.00	1	$	1,000,000.00
			Total System	**$**	**22,313,375.00**

Annual Projected Revenues =	$13,517,280.00
Annual Operating Costs System =	$821,981.66
Annual Net Revenue =	$12,695,298.30

Payback in
1.76 years

OPTIONAL FINISHED PRODUCTS FROM GEODYN TOTAL WASTE SYSTEMS

Waste water will be treated and can be re-used for:

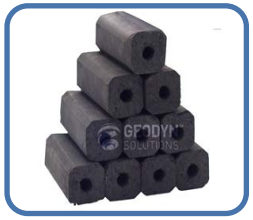
- Irrigation
- Systems cleaning
- Organic liquid fertilizer

Organic fluffs or pellets can be used for:

- Live-stock feed
- Organic fertilizer

Energy Pellets can be used to produce:

- Syngas
- Pyro Oil
- Biochar
- Green Diesel
- Hydrogen
- Electricity
- Running Chiller Plant
- Wood Vinegar



Activated Charcoal/Carbon

Iodine: 500-1200 mg/g

Micro pores: width < 2nm

Carbon content: 95%

MARKET VALUE
$150-$250 per Ton

ORGANIC
Fertilizer

Food waste is composed of organic matter which can be used for composting to make fertilizer. It is an effective and eco-friendly way of disposing of food waste

MARKET VALUE
$200-$300 per Ton

ANIMAL
FEED

Animal feed is food given to domestic animals, especially livestock, in the course of animal husbandry. There are two basic types: fodder and forage

MARKET VALUE
$60-$125 per Ton

ENERGY
PELLET

Pellet fuel is a renewable, clean-burning and cost-stable home heating alternative. It is a biomass product made of renewable substances – generally recycled wood waste.

MARKET VALUE
$600-$1000 per Ton

BIO
CHARCOAL

Biochar is a form of charcoal used as a soil amendment. Though similar in appearance, it differentiates from charcoal that is used for fuel, and is far more beneficial to the environment

Wholesale Price for Output products – Part 1

MARKET VALUE
$500/Ton

PYRO **OIL**

Sometimes also known as bio-crude or bio-oil, is a synthetic fuel under investigation as substitute for petroleum.

MARKET VALUE
$600/Ton

SYNGAS

Synthesis gas is a fuel gas mixture consisting primarily of hydrogen, carbon monoxide, and very often some carbon dioxide. The name comes from its use as intermediates in creating synthetic natural gas and for producing ammonia or methanol.

MARKET VALUE
$0.06/Kw

ELECTRICITY

Power plants either use a boiler to create steam, which generates electricity by spinning a turbine, or they use a combustion turbine to create a rotating mass that creates electricity

MARKET VALUE
$5999 - $9999 PER 1000 Litter

WOOD **WINEGAR**

Wood vinegar is excellent pesticide and fertilizer that improves soil quality, helps elimination of pests and assists in the plant growth control by being able to accelerate the development of plants.

MARKET VALUE
$630-$1200 per ton

Carbon **Black**

Carbon black is mainly used to strengthen rubber in tires, but can also act as a pigment, UV stabilizer, and conductive or insulating agent in a variety of rubber, plastic, ink and coating applications

Wholesale Price for Output products – Part 2

INTRODUCTION

GEODYN™ started with a simple goal - eliminate the need for landfills by developing a system that efficiently produces marketable products from all types of solid waste. The result is our Total Waste System which can turn trash and green waste into marketable products with multiple benefits.

- **TIME** – Our ability to quickly size and process all waste types into marketable products in less than 30 minutes is unmatched.
- **SIZE** – Our systems fit into the smallest per-ton operating space. They can also be sized to accommodate small local or larger regional needs.
- **ENVIRONMENTAL PROTECTION** – Our system is able to eliminate all harmful bacteria and viruses in minutes, through a zero-emission process. Our unique ability to control moisture enables processed material to burn 300% more efficiently that waste-to-incineration systems, thus producing none of the harmful toxins associated with incineration
- **QUALITY AND VARIETY OF FINISHED PRODUCTS** – finished products from Geodyn Ultimate System are quality ensured for industry standards and offer multiples applications.

Total Waste Solution

Landfilling solid waste produces greenhouse gas emissions and creates potentially deadly health risks to groundwater and surrounding environments.

Geodyn Technologies Inc. (“Geodyn”) are the makers of the world’s most innovative waste processing systems that sequester carbon and nutrients rapidly, producing useful products in minutes.

Geodyn’s Total Waste System (“TWS”) uses a patented disruptive technology to turn any solid waste material (municipal waste, organic waste, sewage sludge, etc.) into marketable products with radiant heat. This process kills all harmful bacteria without burning or releasing any harmful emissions. Permitted for operation in California, it is truly the only system that can deliver 5% moisture-content finished product at rates of 15-tons per-hour.

Organic waste (food waste, green waste and crop residue) can be quickly processed into soil amendments, eliminating the time and space required by composting. This system produces an odor free product, while extracting and purifying liquids for irrigation. Thus it also eliminates the odors and water use inherent to composting.

Geodyn eliminates the need for trash incineration and landfilling by turning municipal solid waste into a “green” coal- substitute, effectively sequestering all carbon and BTU value.

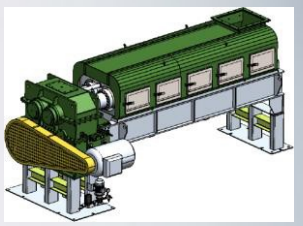
Proprietary Design The Shredder

Proprietary Designed Geodyn Shredder

All of our processing systems start with shredders featuring an innovative design. All Geodyn shredders produce uniformly sized material, while generating less heat and lower RPMs. Consistently tested on the toughest materials (palm fronds and plastic sheeting), our shredders are sized to produce 1/2 to 15 tons-per-hour (“TPH”) in uniform sizes of 50 millimeters or less. This is vital to the process as a small uniform size allows our system to quickly kill bacteria, viruses, and odors.

Dewatering Press

Dewatering Moisture Extracting Press



The material then moves to the Geodyn Dewatering Press to remove excess liquids. This process is used to reclaim and purify water, removing suspended solids and treating the liquid for reuse as irrigation, dust control, truck cleaning or other on-site or off-site uses.

Total System Power Requirement: 570kWh

Fifteen ton per hour (15 TPH) Geodyn System, including Geodyn Pelletizer requires 570 kWh. Without the pelletizer, the system requires only 330 kWh.

PYROLYSIS SYSTEM

CUSTOMIZED SOLUTIONS CAN BE MADE FOR E ACH SCENARIO AND REQUIREMENT

Transferring the Geodyn pellets from the tripledeck on a conveyor to the pyrolysis system.

The Geodyn pellets are transferred to double reactors through the double air locks by cutting off the oxygen supply.

PYROLYSIS SYSTEM

WORLD LEADING STATE O F THE ART TECHNOLOGY

The "PyroOil" gets generated from the processed Geodyn pellets inside the reactors and transfers from the valves through the container. The containers next to the "PyroOil" generator are tanks that produce bio-char or carbon black.

The propane gas system is initialized for the first 60 minutes through six opposing burners till the temperature rises to 600 degrees Celsius. Then production of the 'Geodyn Generated SynGas' will engage the engine to run the generator.

PYROLYSIS SPECIFICATIONS

RAW MATERIAL SPECIFICATIONS

The system is able to pyrolyze biomass based raw material with organic content. Raw material needs to be dry and the content of the raw material contains the following limitations.

The capacity of the system:

- **Moisture Content ≤ 6 %**
- **PET + PVC + ABS ≤ 3% (wt)**
- **Calorific value ≥ 3500 kcal/kg**
- **Particle size ≤ 8 x 8 x 20 mm**
- **Bulk Density ≥ 750 kg / m3**
- **Metallic content ≤ 1% (wt)**

Products' quality and amount changes according to raw material properties. According to plastic content of raw material catalysts may need to be used.

System Capacity: 1000 kg/hour raw material Liquid Oil Percentage after pyrolysis: 37 %(wt) on dry basis raw material Calorific Value of Liquid Oil with no moisture content ≥ 9000 kcal / kg

TECHNICAL SPECIFICATIONS OF EQUIPMENT REACTOR

Material : Drive : Sealing : Refractory : Burner:

HEAT EXCHANGERS

Material : Surface Area :
P355 GH or equivalent

Frequency controlled electric motor
Graphite @ High temp regions
Viton @ Medium temp regions
AISI 304 steel fiber reinforced min. 40% Al2O3 refractory material AISI 304 anchor rods
128 kg/m3 Ceramic Fiber
600000 kcal / h capacity gas burner
Able to burn process gas
S235 Mild Steel
min. 34m^2 cooling surface area

AUTOMATED FEEDING SYSTEM

Material : S235 Mild Steel
Specifications: Automated with Double flap gate system with sealing. Screw conveyors drive: 3 kW with frequency control

AUTOMATED DISCHARGE SYSTEM

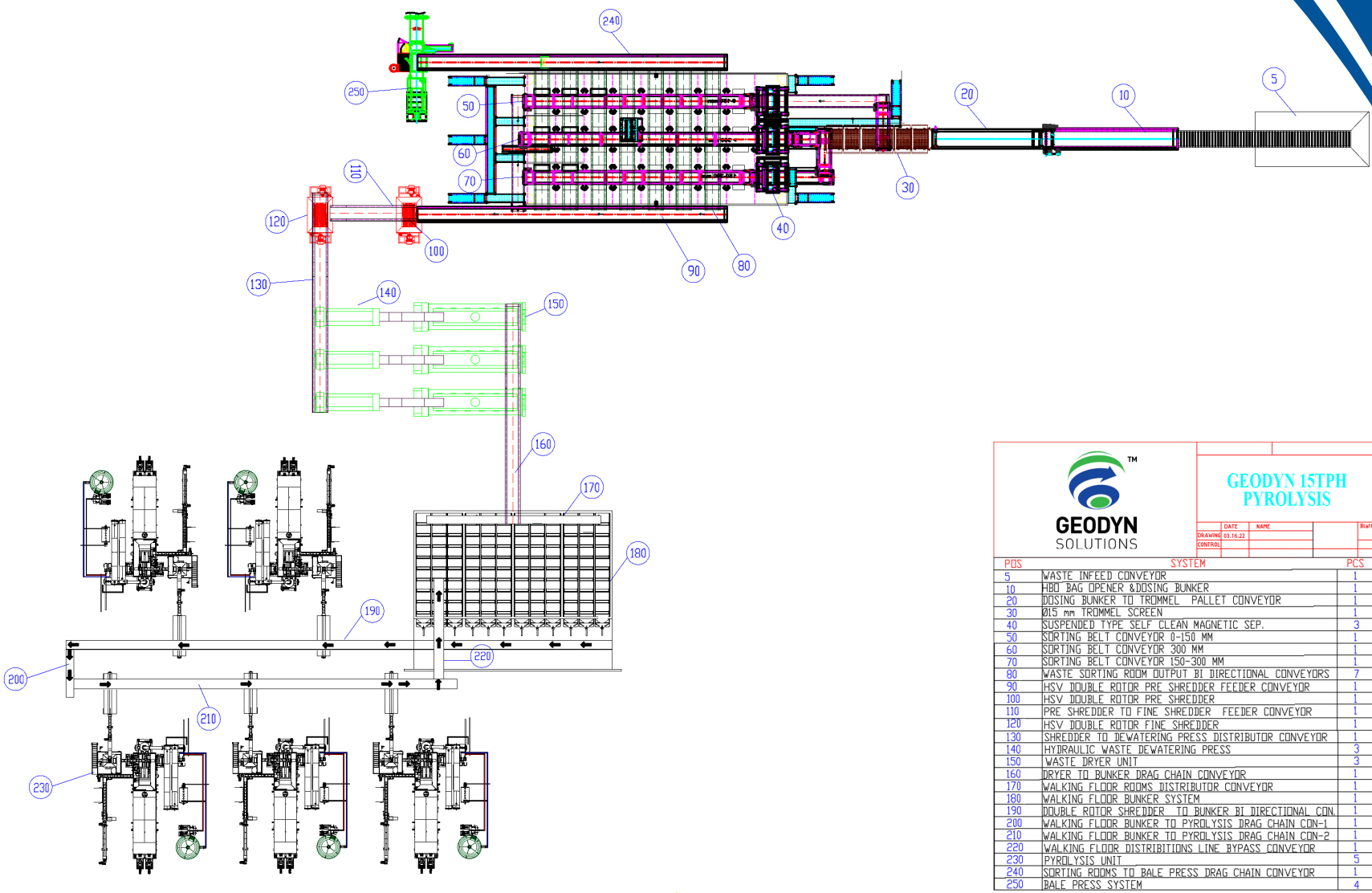
Material: S235 Mild Steel
Specifications: Automated with Double flap gate system with sealing. Cooling: Water cooling jacket & Shaft cooling Screw conveyors drive: 3 kW with frequency control

OIL TANK

Material: S235 Mild Steel Capacity : 3m^3
NITROGEN GENERATOR SET with COMPRESSOR
Type: PSA - Automated Capacity : 10 m^3/ hour @ 99 % N2 Air Compressor : Included
Nitrogen Tank: Included
Air Dryer: Included
Air Tank: Included
ELECTRIC SYSTEM & PLC
All sensors and electric equipments have been approved according to UL standards.

OTHER EQUIPMENTS

- Process Blower or Vacuum Pump
- Stack gas Fan
- Automated Process Gas Burning System
- Flare System
- Oil Pumps
- Water Pumps



GEODYN SOLUTIONS

GEODYN 15TPH PYROLYSIS

	DATE	NAME	
DRAWING	03.16.22		
CONTROL			

POS	SYSTEM	PCS
5	WASTE INFEED CONVEYOR	1
10	HBD BAG OPENER &DOSING BUNKER	1
20	DOSING BUNKER TO TROMMEL PALLET CONVEYOR	1
30	Ø15 mm TROMMEL SCREEN	1
40	SUSPENDED TYPE SELF CLEAN MAGNETIC SEP.	3
50	SORTING BELT CONVEYOR 0-150 MM	1
60	SORTING BELT CONVEYOR 300 MM	1
70	SORTING BELT CONVEYOR 150-300 MM	1
80	WASTE SORTING ROOM OUTPUT BI DIRECTIONAL CONVEYORS	7
90	HSV DOUBLE ROTOR PRE SHREDDER FEEDER CONVEYOR	1
100	HSV DOUBLE ROTOR PRE SHREDDER	1
110	PRE SHREDDER TO FINE SHREDDER FEEDER CONVEYOR	1
120	HSV DOUBLE ROTOR FINE SHREDDER	1
130	SHREDDER TO DEWATERING PRESS DISTRIBUTOR CONVEYOR	1
140	HYDRAULIC WASTE DEWATERING PRESS	3
150	WASTE DRYER UNIT	3
160	DRYER TO BUNKER DRAG CHAIN CONVEYOR	1
170	WALKING FLOOR ROOMS DISTRIBUTOR CONVEYOR	1
180	WALKING FLOOR BUNKER SYSTEM	1
190	DOUBLE ROTOR SHREDDER TO BUNKER BI DIRECTIONAL CON.	1
200	WALKING FLOOR BUNKER TO PYROLYSIS DRAG CHAIN CON-1	1
210	WALKING FLOOR BUNKER TO PYROLYSIS DRAG CHAIN CON-2	1
220	WALKING FLOOR DISTRIBITIONS LINE BYPASS CONVEYOR	1
230	PYROLYSIS UNIT	5
240	SORTING ROOMS TO BALE PRESS DRAG CHAIN CONVEYOR	1
250	BALE PRESS SYSTEM	4