

# "VORAX"

**A SCIENTIFIC BREAKTHROUGH IN SOLID WASTE TREATMENT**



## Introduction

WPP Energy presents VORAX, a scientific breakthrough in the ideal treatment of nearly all types of Waste such as MSW/Urban, Medical/Hazardous, Industrial, Pasty/Sludge, Liquid, Tires. There are 12 different models of Vorax which have capacities ranging from 2 Tons of Waste per day to our largest model which can treat 400 Tons of Waste per day. Models from 22T/day and up also have steam power generation packages available to create electricity, demonstrating VORAX's significant Waste to Energy (WtE) capability.



"ETNA" 2T/day model shown

Vorax is in a technological classification of its own after more than 10 years of R&D from a brilliant team of scientists and in the invention of DuoTherm technology which puts Vorax ahead of plasma, Incineration, Gasification and also traditional pyrolysis. Vorax is thought of as a quantum leap over traditional Pyrolysis in part because two thermal processes, one at 1600°C and the other at 900°C, forming a thermal gradient, liquifying all solids completely, even inert materials such as sand or iron.



## Waste types that vorax can process:

- Medical/Drugs/Sharpies
- Municipal and Urban Waste
- Industrial
- Pesticides and their containers
- Biomass
- Animal Housing
- Coal
- Ashes from incinerators
- Sewage
- Galvanic sludge
- Organic sludge from petrochemical
- Materials with low radioactivity
- Used oils
- Batteries
- Tires
- Waste of explosive material
- Hazardous industrial waste
- Plastics (no restrictions)



# WPP VORAX Product Line at a Glance

12 Models to Choose from!

See Q&A Section on (page 22) for more info

Name	Technology	Platform	Type	Components	Application	Model	Capacity	Utilization	Gross Electric Power (before Vorax's own consumption)	NET Energy Generation (after Vorax's own consumption)
Vorax	Duo Therm	Volcano	UTR	Storage Crusher Feeder System Fusion Module Peripherals Monitoring and Control	Waste Treatment Only	Etna	2 ton/day	Solid, Medical	Not applicable	Not applicable
						Kilauea	4 ton/day	Solid, Medical		
						Kilimanjaro	5 ton/day	Solids, Liquids, Pasty, Medical		
						Krakatoa	10 ton/day	Solid, Liquid, Pasty, Medical		
		Solar One	UTE	Waste Storage System Crusher Feeder System Fusion Module Peripherals Monitoring and Control Steam Generator Boiler Compression Turbine Reductor Power Generator Unit Sub-station	Waste to Energy with Power Generation Package Included	Zeta One	22 ton/day	WDF - TDF 1,04t / MWh - 0,83t / MWh, Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	0.77 MW	0.60 MWh *
						Zeta Two	36 ton/day	WDF - TDF 1,35t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	1.26 MW	0.98 MWh *
						Rigel One	60 ton/day	WDF - TDF 1,04t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	2.10 MW	1.64 MWh *
						Rigel Two	72 ton/day	WDF - TDF 1,35t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	2.52 MW	1.97 MWh *
						Altair One	110 ton/day	WDF - TDF 1,35t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	3.85 MW	3.01 MWh *
						Altair Two	150 ton/day	WDF - TDF 1,04t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	5.25 MW	4.10 MWh *
						Procyon	220 ton/day	WDF - TDF 1,35t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	7.69 MW	6.01 MWh *
						Orion	400 ton/day	WDF - TDF 1,35t / MWh - 0,83t / MWh Medical, Hazardous, Industrial, MSW, Solids, Liquids, Pasty, Medical	13.99 MW	10.93MWh *

ALL VORAX MODELS CAN BE OPERATED INDOORS OR OUTDOORS

10.93MWh assumes MSW with PCI (Lower Calorific Value of 2780 kCal/kg). Higher outputs achievable depending on types of waste used as feedstock.  
Example: TDF (tires) 7000 kCal/kg = 35.22MWh gross = 32.17MWh net (after Vorax consumption).

\* Calculation Basis - CDR

## VORAX - Component Parts

- Waste Storage System (CDR / CDP, others)
- Waste Preparation System (Shredder)
- Feeding System: solid, liquid, pasty (silo, tipper, track, worm thread, valve feed lines)
- Thermal Unit: Fusion Module (fusion module - transient catalyst / plasma, gasifier, afterburner)
- Peripherals: gas scrubber, filters, hood, by-product collector, etc.
- Monitoring and Control Center
- Direct Labor: Teams, Consulting
- Power Generation Unit: boiler, turbine - condensation / back pressure, reducer, electric generator, substation

## Note

1. WTUs Dimensions, Total Area and Costs: estimated values; they must be sharply determined after basic Power Plant project execution.
2. WTUs Prices (22 t/day 36 t/day, 60 t/day, 72 t/day, 110 t/day, 150 t/day, 220 t/day and 400 t/day): estimated values; they must be sharply determined after basic Power Plant project execution.

## Legend

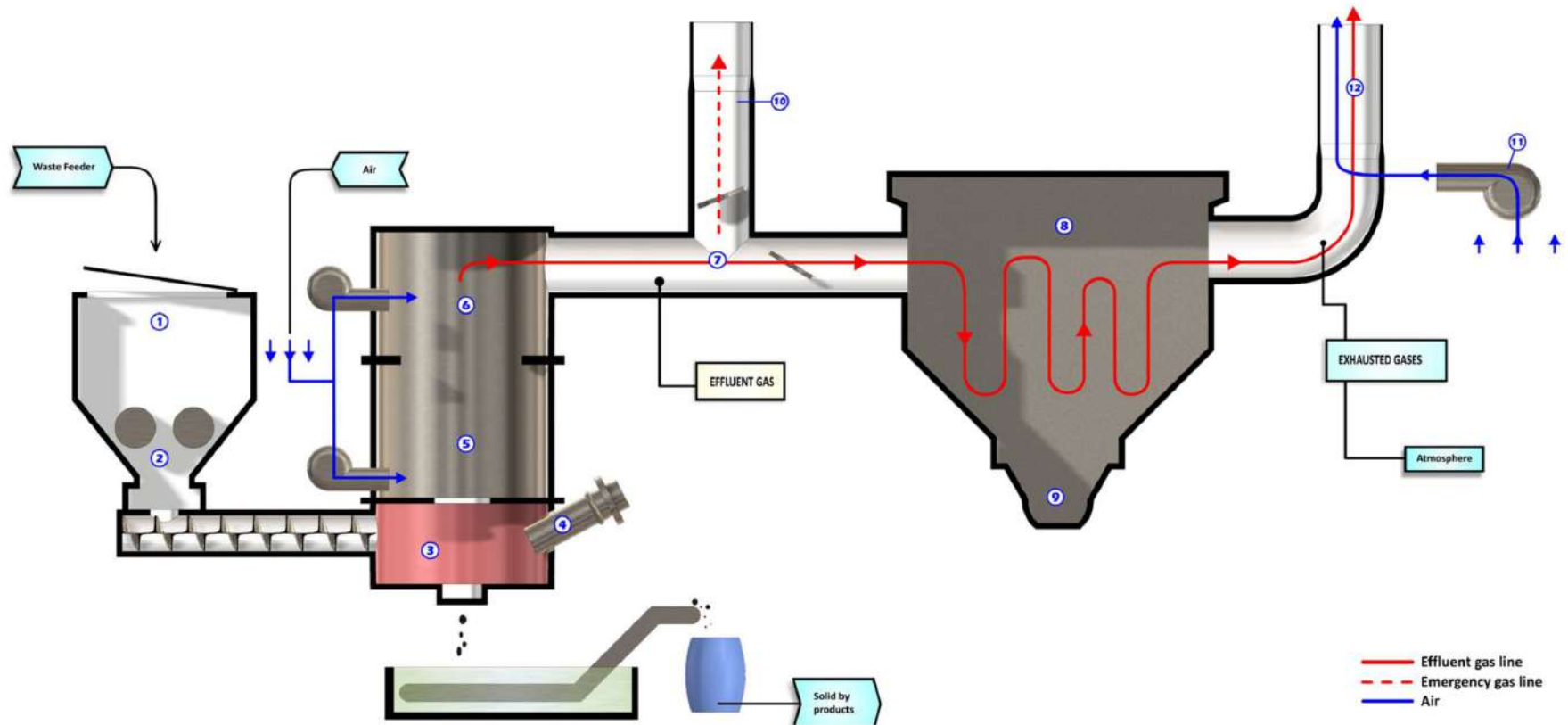
- WDF - Waste Derived Fuel
- TDF - Tire Derived Fuel
- WTU - Waste Treatment Unit
- TU - Thermoelectric Unit



# VORAX PROCESS FLOW SCHEMATIC FOR MODELS: 2T, 4T, 5T, 10T/Day

(No power generation package offered)

1. Feeder
2. Waste Shredder
3. Pyrolysis
4. Torch
5. Combustor
6. Afterburner
7. Safety Valve
8. Filter Sleeve
9. Particulates
10. Chimney Backup
11. Exhaust Fan
12. Chimney

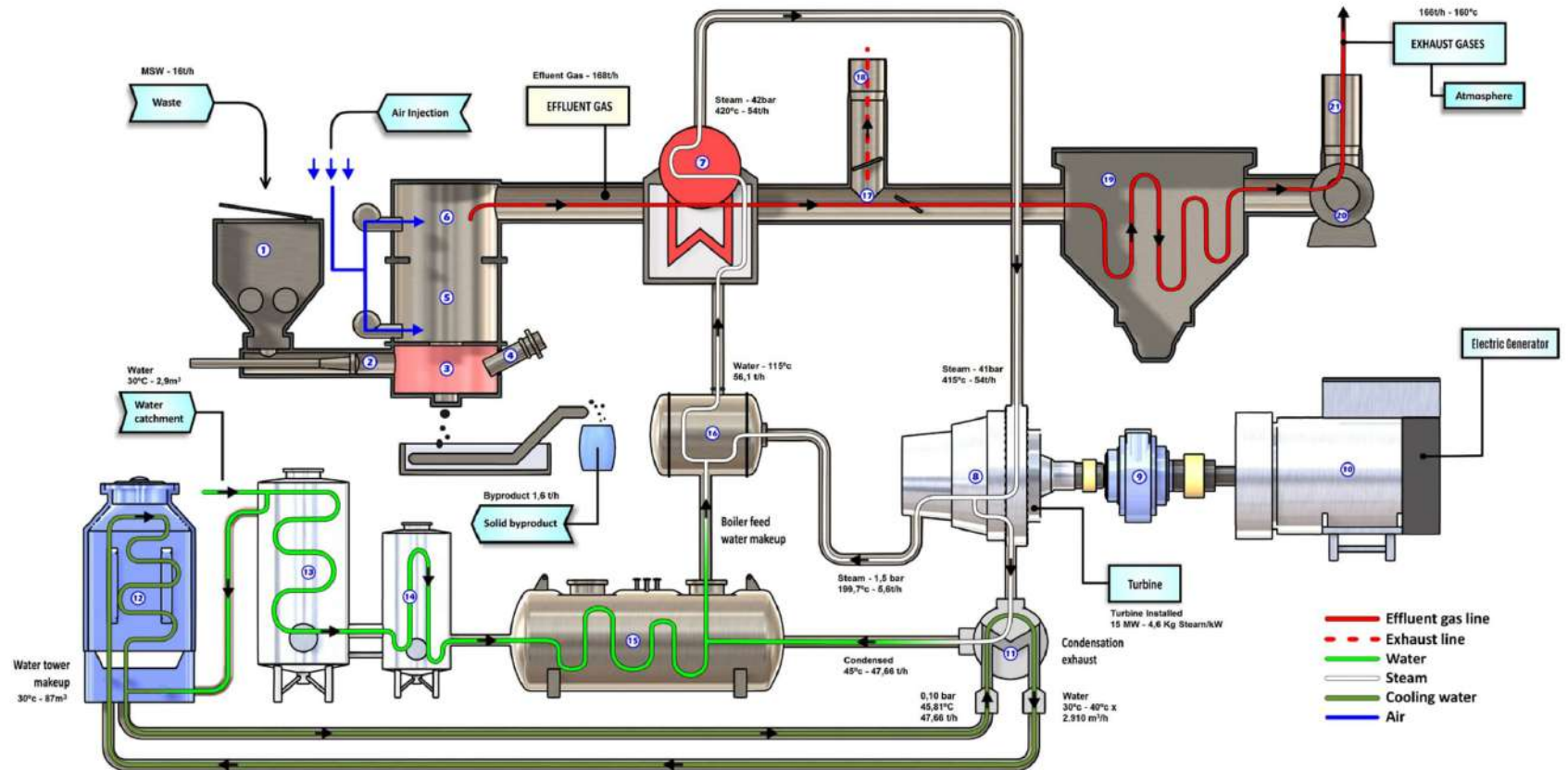


**VORAX**

# VORAX PROCESS FLOW SCHEMATIC FOR MODELS: 22T, 36T, 60T, 72T, 110T, 150T, 220T, 400T/Day

(Power Generation Package Included, but not mandatory)

1. Feeder
2. Piston
3. Pyrolysis module
4. Torches
5. Combustor
6. Pro Combustor
7. Steam Boiler
8. Turbine
9. Reducer
10. Generator
11. Condensation Outlet
12. Cooling Tower
13. Water Treatment Tower
14. Dehumidifier
15. Condensate Tank
16. Deaerator
17. By Pass Valve
18. Escape Chimney
19. Particulate Filter
20. Exhaust
21. Chimney



# VORAX



# INTERNATIONAL AWARD 2016



## IN THE ENVIRONMENTAL CATEGORY

The technology is patented in over 40 countries and is being made available for distribution globally by WPP Energy after initially being deployed in Brazil.

