



PTDR-100

transforming today's waste into
tomorrow's energy through the power of plasma

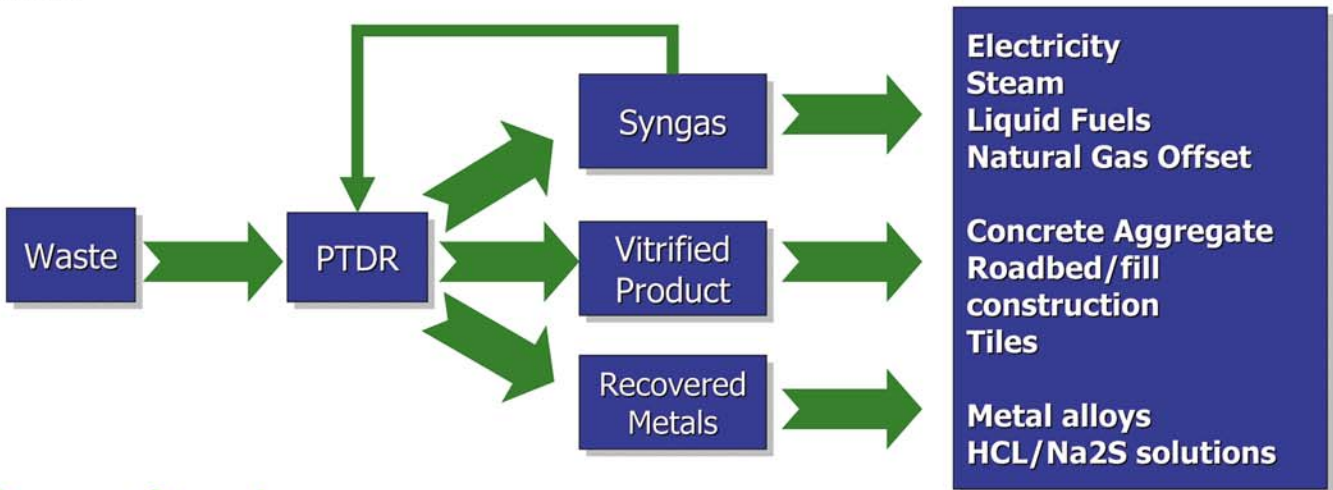
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PTDR-100

PEAT International, headquartered in Northbrook, Illinois, is a waste-to-energy and resources company specializing in the deployment of its proprietary Plasma Thermal Destruction Recovery ("PTDR") technology for the treatment and recycling of a wide range of waste feedstocks, including: industrial, universal and medical waste.

PEAT's PTDR-100 system is an ideal, turn-key solution for small to medium-sized waste generators looking for stable and flexible on-site solutions to their waste management challenges. The PTDR-100 system provides a permanent, fully self-contained platform for facilities seeking an efficient, environmental and economical terminal treatment and disposal solution.



Process Overview

The innovative and patented PTDR technology uses heat generated by plasma torches in an oxygen starved (pyrolysis/gasification) environment to first pull apart (dissociate) the molecules that make-up the organic portions of the waste, then, depending on the composition of the waste stream, a controlled (stoichiometric) amount of oxygen is added to reform the dissociated elements of the waste into a synthesis gas ("syngas"), consisting mainly of Carbon Monoxide (CO) and Hydrogen (H₂). The syngas can then be used in a variety of ways: as a fuel for thermal and/or electricity production or as a feedstock for the production of liquid fuels, such as ethanol.

Waste, when heated to a very high temperature in the controlled atmosphere of the reducing plasma reactor undergoes predictable physical and chemical changes. This high temperature, over 1,000°C (1,800°F) prevents the formation of complex organic molecules and breaks down organics into a gas. These primary molecules are stable above 965°C (1,770°F). Our research reflects that the formation of dioxins or furans is impossible inside the plasma reactor due to the unique process features, including high uniform temperatures and a lack of excess oxygen within the system.

Any inorganic constituents of the waste are melted (vitrified) into an environmentally safe, leach resistant, glass matrix. PTDR plasma reactors are designed to collect the molten metal and glass. The glass and metal layers are removed through controllable tap ports into a slag/metal collection system. The taps are connected to the slag handling system to allow automated removal of the slag upon operator command. Removal of the molten glass presents no hazards of any kind to personnel, requires no special tools and does not disrupt the operating process. The metal layer, which settles on the bottom of the basin in the processing reactor, below the molten glass, is tapped as necessary, depending on the metal content of the waste stream.

This product can be used in a variety of commercial applications including concrete aggregate, insulation, or roadbed construction.

Warranty Data

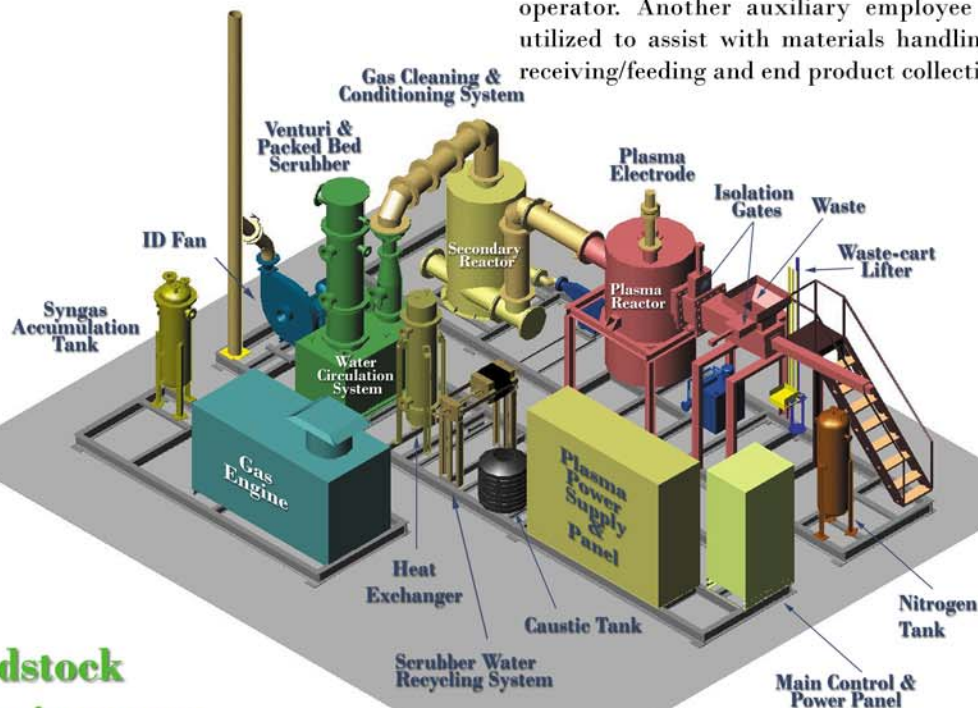
PEAT will warranty the system for 12 months from the date of commissioning. The Warranty will be against the manufacturing of equipment and components defects. The warranty does not cover spares, refractory lining, thermocouple and transmitters, other consumables and chemicals. The warranty does not cover equipment or its parts that are damaged due to client's cause, directly or indirectly.

System Capacity 60 kg/hr (130 lbs)

- Feeding system consisting of a ram feeder and a cart-lifter/dumper (Liquid waste feeding optional)
- Plasma Reactor
- Secondary Reaction Chamber
- Gas Conditioning and Cleaning System consisting of a venturi scrubber, packed bed tower, cooling water loop (optional cooling tower supplied if not available at client site) and indirect heat exchanger
- ID fan with breaking resistance and VFD
- 100 kWe Plasma graphite electrode Torch System with an insulated gate bipolar transistor power supply
- Air Compressor
- Syngas storage/accumulation system (for Syngas Operational Mode)
- Syngas Energy Recovery System (Optional):
 - 25 or 50 kWe gas engine(s), or
 - Steam Boiler, or
 - Hot Water Heating System
- Power Panel
- Process Control System with a PLC and SCADA

Utilities & Labor

- Electric supply available: maximum connected load of 150 KWe, voltage/Hz as per local standards), 3Phase, (actual consumption significantly lower)
- Process water capacity of approximately 150 liters/hr (~5.5 ft³)
- Cooling Water Supply: 40 m³/hr (~1,415 ft³) with a temperature difference of 7°C (45°F)
- Nitrogen gas (used for feeding system blanketing and other safety operations): 250 liter (~ 66 gallons) Nitrogen Storage tank (stored at a pressure of 3 kg/cm² or 43 PSI), consumption during normal operations at 3.5 nm³/hr
- Natural Gas or LPG capacity of approximately 10kg/hr (0.5 MMBTU) during pre-heating and a maximum of 2 kg/hr (0.1 MMBTU) during normal operations (actual consumption significantly lower)
- The automated process control system allows the PTDR-100 to be operated by a single trained operator. Another auxiliary employee may be utilized to assist with materials handling (waste receiving/feeding and end product collection).



Feedstock Requirements

Solid wastes are batch fed (up to 21 hours per day). The feeding system is designed to accommodate 30-gallon (113 liters) waste bags, 250mm x 250mm x 250mm (10-inch x 10-inch x 10-inch) boxes or waste in packed loose solid form. The maximum size of any waste material which can not be twisted/bent can not be more than 200 mm (~8 inches); this means that any part cannot be longer than 200 mm. The feed door to the system will have clear opening of 300 mm (~ 1 ft) on both sides.

System Footprint

The main PTDR system sits on two 10m x 2m skids (approximately 33 ft x 6.5 ft) with a high point of 4.5m (15 ft). An optional third skid (5m x 2m or approximately 16.5 x 6.5 ft) is provided, which houses the syngas accumulation system and syngas energy recovery equipment (if

