CLEAN PYROLYSIS - T RANGE

Medium to large sized installations

Typical use of the T Range involves the disposal of municipal solid waste for medium to large sized population centres of between forty thousand and four hundred thousand people, such as may be found in many towns and rural community centres. It may also be applied to clean energy production from biomass waste in large biomass handling facilities, such as large saw mills, rice processing facilities (for energy production from rice husk), palm oil mills, coconut mills and similar such locations.

The T Range starts with a dry mass input rate of twenty-four metric tonnes per day and reaches to a module-maximum of two hundred and fifty tonnes per day. Larger throughputs may be handled with this equipment configuration by means of multiple modules.

KEY FEATURES

ELECTRICAL AND THERMAL ENERGY PRODUCTION FROM BIOMASS WASTE STREAMS

EXCEPTIONALLY CLEAN EMISSIONS

PURE PYROLYTIC ATMOSPHERE FOR THERMAL REDUCTION

BASE-UNIT FOR MIXED WASTES SET UP TO PRODUCE ENERGY VIA THE STEAM CYCLE

HOMOGENOUS WASTE STREAMS MAY BE USED TO GENERATE ELECTRICITY FROM SPARK IGNITION ENGINES, DOUBLING ENERGY CONVERSION EFFICIENCY

ABILITY TO DISPOSE OF HAZARDOUS, CONFIDENTIAL AND CLINICAL WASTE STREAMS TO VERY HIGH ENVIRONMENTAL STANDARDS

SPECIFICATION DATA

Mass flow rates available:
40 to 400 tonnes (wet) per day
24 - 250 tonnes (dry) per day

Availability:
Normal operation: 85%
Preventative maintenance: 90%

Moisture content:
Moisture content will reduce thermal and electrical output. The unit is designed for 40% moisture content (wet basis) but can take larger loadings.

Waste types:
- Biomass of many varieties
- Sorted municipal solid waste
- Clinical waste
- Thermally degradable hazardous waste
- Confidential waste

Thermal energy production
Using woodchips with a 40% (wet basis) moisture content, thermal energy output is as follows:

40 w tonnes/day: 3.69 MW
200 w tonnes/day: 18.44 MW
400 w tonnes/day: 36.88 MW

Electrical conversion efficiency:
Gas engine: 35%
Steam turbine: 22%

Max steam-cycle electrical energy production:
40 w tonnes/day: 0.8 MW
200 w tonnes/day: 4.0 MW
400 w tonnes/day: 8.1 MW

Land requirements
This is as much a function of the process capacity as the actual process selected. As an indication of land requirements, a 40 w tonne/day unit will fit into a building 50m x 25m. A unit rated at 250 w tonne/day unit will require a footprint of approximately 100m x 70m; both excluding site-specific front-end pre-requisites.

TECHNOLOGY

The Clean Pyrolysis process uses patent-protected methods for the introduction of high-heat loadings into the pyrolysis chamber by unique means. Heat input and thermal degradation occurs through the action of super-heated water. In absence of air and in the presence of water, burning does not occur. The technology involved is not comparable to incineration, where flames and burning zones need to be controlled.

Wet biomass feed-stocks are initially shredded down to an acceptable maximum size. They are then passed to torrefecation drying, ie the use of thermal drying in the absence of air. The use of torrefaction ensures that the maximum energy is obtained from any specific feedstock and that product gas dilution with air does not occur.

In the pyrolysis section of the process, biomass is converted to pyrogas and syngas. These gases are subsequently either fed directly to an internal combustion engine, in the case of relatively clean and homogeneous biomass sources, or to a thermal oxidiser and waste-heat boiler, in the case of dirty or variable composition biomass sources.

Internal combustion engines have a greater thermal efficiency in the conversion of pyrogas and syngas to electricity. It is, however, necessary to be sure that the gas source is acceptably stable and manageably free of tars. High tar loads can render an engine inoperable in a relatively short period of time.

The steam cycle commences with a clean combustion cycle and conversion of heat to steam for use in a steam turbine. Whilst less efficient the overall process is highly reliable.

THE T RANGE

The T Range involves equipment sizes that would not normally be packed onto skids. This equipment is for more permanent facilities. Municipal waste disposal, for instance, involves a long-term requirement to reliably dispose of large waste volumes in an environmentally acceptable manner. The T Range is designed for exactly such circumstances and can be applied to simple municipal waste, clinical waste and certain types of hazardous waste. The fact that the process does not require an external source of energy to keep it running, once started, is a key factor in its selection. With anything but very wet wastes it is a net producer of energy.

The production of excess energy in the thermal degradation of waste leads to the possibility of long-term waste disposal together with renewable energy production, all within a commercial framework where previously there existed only cost.

The T Range has exceptional emission standards as a result of the complete absence of flames in the reduction of waste to gas. It is from flames developing in excess air that the worst types of combustion byproducts are formed, such as dioxins and furans. The precursor conditions do not exist in the Clean Pyrolysis process.

This unit is designed for small towns and larger conurbations. It may also be used for large waste biomass sources.

Organics Group plc

Sovereign Court II
University of Warwick Science Park
Coventry CV4 7EZ,
United Kingdom
T: +44 (0)2476 692141
F: +44 (0)2476 692238
E: comms@organics.co.uk
W: www.organicsgroup.com