



**plantee**

ASIA PACIFIC





# Our Mission

To make a better living environment on a global scale

Plantec Asia Pacific Pte. Ltd. (Singapore) was launched in August 2017 as a wholly owned subsidiary of Plantec Inc. (Osaka, Japan) after successfully delivered a first-of-its-kind toxic industrial waste Vertical Combustor™ Incineration Plant in Tuas, Singapore.

Established as a Singapore-based international business development, Plantec Asia Pacific aims to promote Vertical Combustor — a new type of incineration technology invented in Japan — across Asia-Pacific region.

As the issue of cost effective and sustainable waste management system has become one of the biggest global challenges in recent years, Plantec Asia Pacific strongly believes that Vertical Combustor is the solution: The new incineration technology that has achieved stable and efficient combustion process without using auxiliary fuel, regardless of waste types to treat including biohazardous and toxic industrial waste. It will benefit the waste management companies as well as municipalities who are facing performance issues with the conventional types of incinerators.

Our team of skilled engineers has been working diligently in developing innovative waste treatment technologies over the years, with the objective to formulate Vertical Combustor Incineration Plant to its finest performance in order to meet the clients' needs and satisfaction.



## Corporate Profile

**Company name:** Plantec Asia Pacific Pte Ltd

**Registration number:** 198903292E

**Managing director:** Motoaki Katsui

**Phone:** +65 6222 1114

**Email:** info@plantec-ap.com

**Foundation:** 1 August 2017

**Paid-up capital:** 1,650,000.00 Singapore Dollars

## Business Activities

- Engineering and procurement of incineration plants
- Revamping of incineration plants
- Overhaul for existing incineration plants
- 3D modeling, structural analysis and consulting
- Software programming

## History of Plantec Inc.

Founded by Mr Seizo Katsui in 1967, Plantec Inc. have engaged in R&D of waste and flue gas treatment systems for more than 50 years. As of date, they have delivered more than 150 incineration plants in Japan as well as overseas. In 1994, Plantec delivered the first Vertical Combustor™ with 'SLA (Super Low Air ratio) Combustion Method' which made the cost effective waste combustion possible. Its unflinching performance in treating different types of waste, including the highly contagious medical waste in the past 25 years (and counting) has been a proven record of efficacy in waste thermal treatment.

## Awards



### Medal of Honor – Yellow Ribbon (Japan)

In 2008, Chairman Mr Seizo Katsui received the *Medal of Honor – Yellow Ribbon* from His Majesty the Emperor of Japan; in recognition of his lifelong dedication in R&D on innovative waste treatment technologies.

### Minister of the Environment Award (Japan)

In 2016, Mr Seizo Katsui was awarded the *Minister of the Environment Award* for his valuable contributions to R&D of waste treatment technologies, which have made a profound impact on Japan's public health.

and many more...





# The Vertical Combustor™

Performance proven for coming decades

The Vertical Combustor employs 'SLA Combustion Technology' invented by Plantec.

Waste fed into the Vertical Combustor (right image) drops to the primary combustion chamber by gravity. The waste in the primary combustion chamber is partially combusted (carbonized) and pyrolyzed (combustible pyrolysis gas is generated) due to the Super Low Air ratio primary air ( $\lambda \leq 0.5$ ) supplied from the bottom.

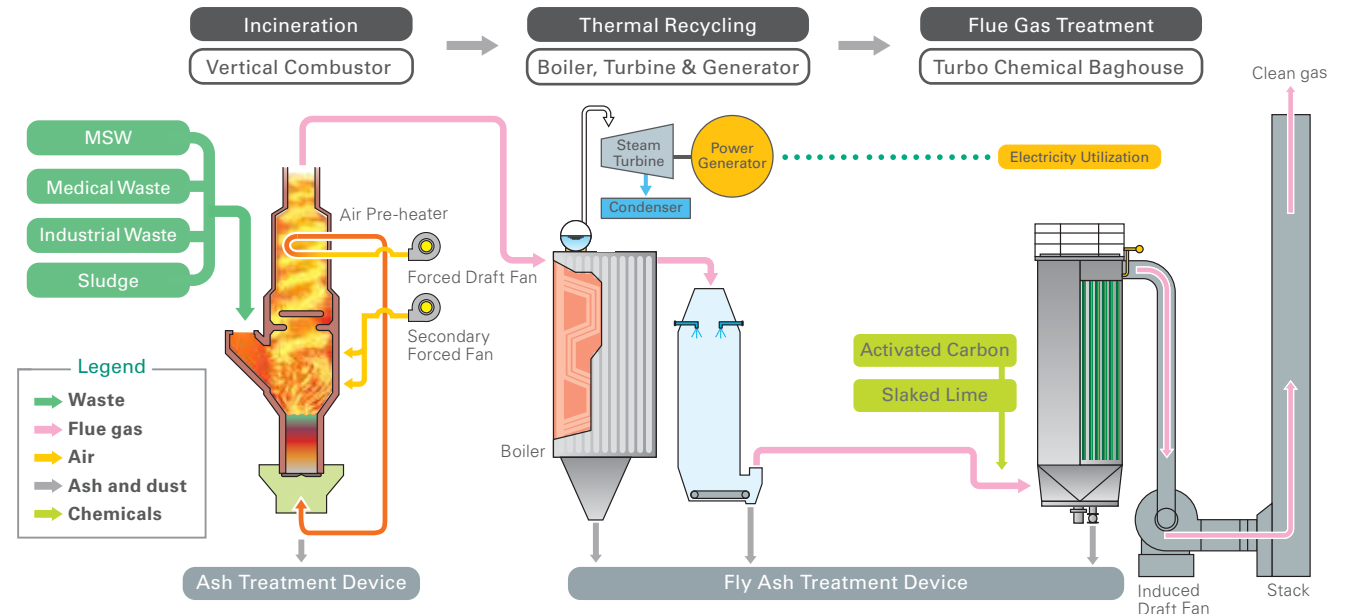
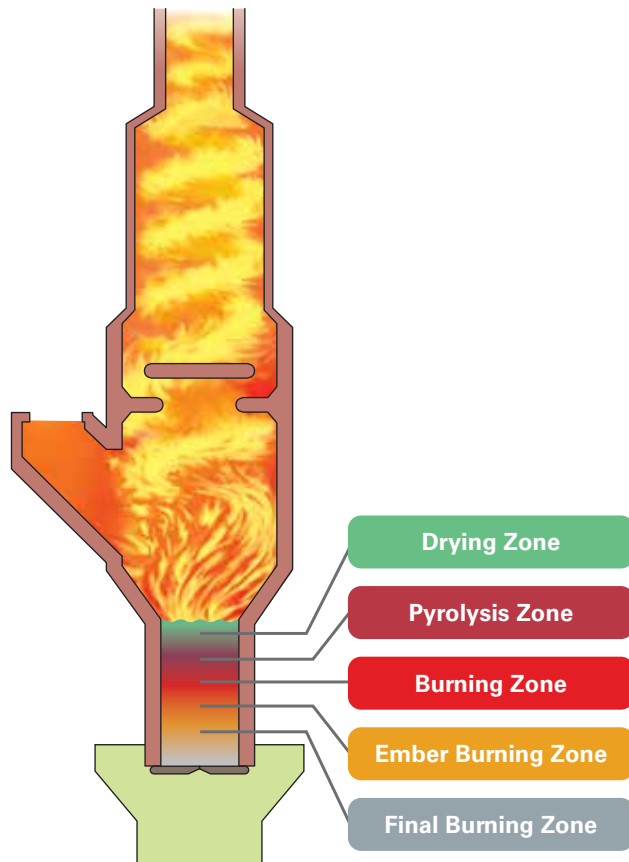
Waste is continuously fed into the furnace by automated feeding system, hence the new waste stacked on top of the waste layer (Drying Zone) is completely dried by high temperature pyrolysis gas coming up from Pyrolysis Zone. The dried, carbonized solid wastes are 'ready-to-burn' solid materials. Therefore they can be combusted easily in the Burning Zone. Due to long retention time in the Ember Burning Zone and Final Burning Zone (ash layer), all the unburned solid residues are then completely burned out and turned into ash. Incineration ash is then intermittently discharged to a water sealed ash conveyor installed underneath the furnace.

At the meantime, combustible gas generated through pyrolysis process is further combusted in the upper part of the furnace (freeboard) by excess secondary combustion air. This two-stage combustion optimizes minimal generation of harmful substances in flue gas. The uniqueness of this technology is its ability enabling pyrolysis process without using auxiliary fuel and separate combustion of solid residues and flue gas in a single system.

The Vertical Combustor: A simplified yet improved performance for our better living environment.

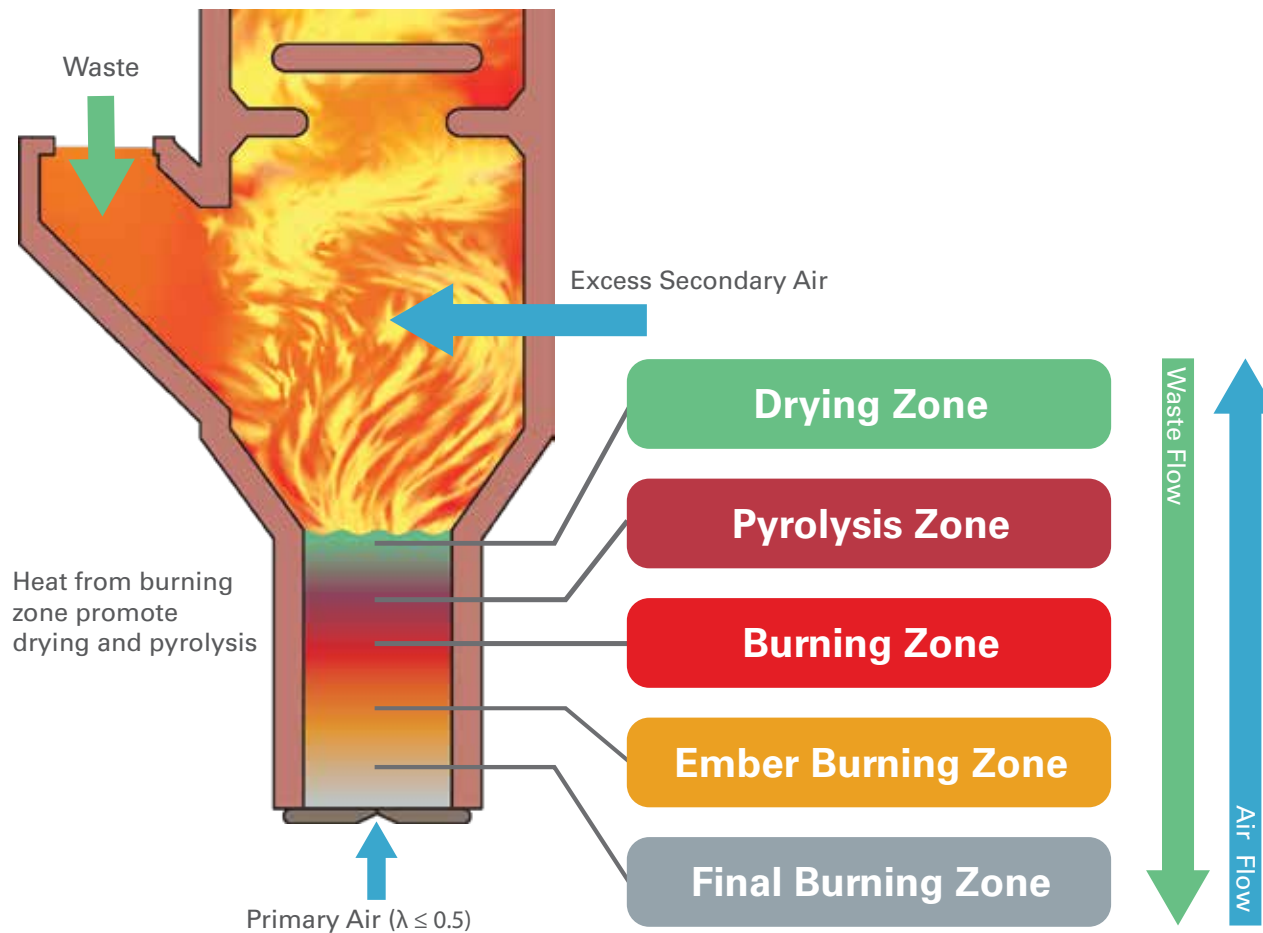
# Turning waste into fuel for perfect combustion

## Flow Diagram



# SLA Combustion Technology

Solid residues and flue gas are separately combusted



## Key Features

- Efficient drying and pyrolysis inside furnace
- Contact ratio of waste and air is optimized
- Minimizing dioxins thru two-stage combustion



# Robust to changes in waste quality

## Suitable for various types of waste

Sludge	Municipal Waste	Industrial Waste	Medical Waste
< 1,000 kcal/kg < 4.1 MJ/kg	> 2,000 kcal/kg > 8.3 MJ/kg	> 3,500 kcal/kg > 14.6 MJ/kg	> 4,000 kcal/kg > 16.7 MJ/kg



## Advantages

- No auxiliary fuel is required
- No waste pre-treatment is required
- Easy to operate
- Minimal mechanical maintenance
- Small footprint (Only 600 m<sup>2</sup> for 50 tpd)

## Thermal Recycling

- Power generation
- Hot water generation
- Absorption chiller







# Turbo Chemical Baghouse™

Meeting International Emission Standards

## Efficient Flue Gas Treatment

- A uniquely high-performance dry-type chemical reaction dust collector designed by Plantec
- Pre-coated chemical shield on filter bags ensures higher chemical reaction efficiency
- Extended filter life due to pre-coated chemical shield provides protection against acidic gases
- Meet the EU emission standards

Reference data taken from the existing plant

Item		Inlet	Outlet	Removal ratio
Dioxins	Particulate	0.18	0.0000005	99.99%
	Gaseous	0.14	0.00013	99.90%

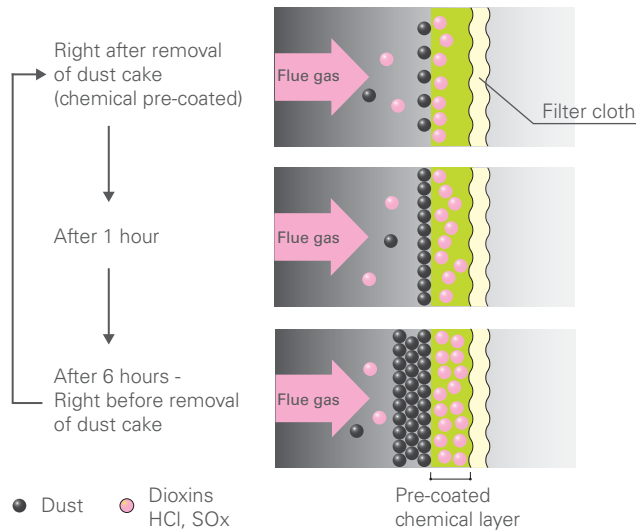
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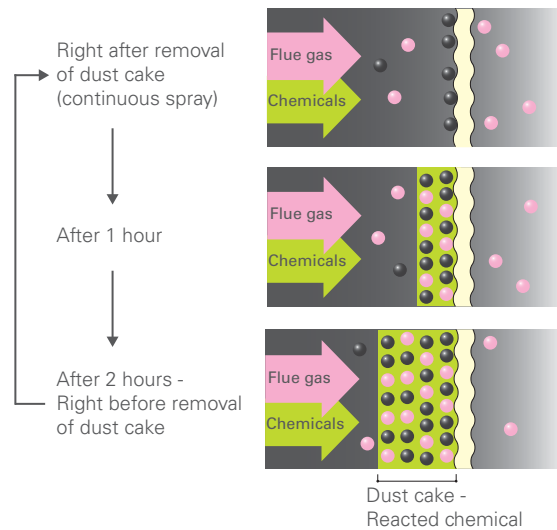


## Comparison with Conventional Baghouse

### • Turbo Chemical Baghouse™

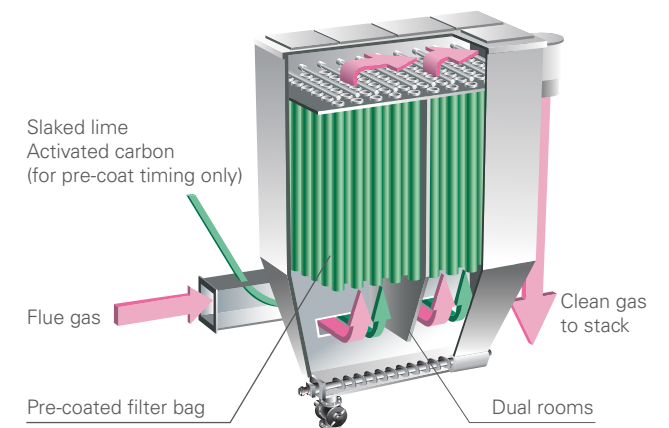


### • Continuous spray type baghouse



## Advantages

- Higher efficiency in flue gas treatment
- Less chemical consumption
- Longer filter life





# Delivered More Than 150 Plants

**Vetical Combustors™ delivered by Plantec** (excluding stoker furnaces and repeat orders)

Waste Type	Owner / Client	Location	Capacity	Completion
Medical	Kyoto University Hospital	Kyoto	8 t/8 h	1994
Medical & Industrial	Narikoh Co., Ltd. *1	Chiba	42 t/24 h	1998
Medical & Industrial	Chigusa Kosan Co., Ltd.	Chiba	24 t/24 h	2002
Medical & Industrial	Shikoku Medical Treatment Centre *2	Tokushima	30 t/24 h	2002
Medical & Industrial	Dispo. Inc.	Hokkaido	30 t/24 h	2003
Medical	J&T Recycling Corporation	Tokyo	100 t/24 h	2007
Medical & Industrial	Sankyu Co., Ltd.	Wakayama	24 t/24 h	2008
Medical & Industrial	Cleantech Thermal Inc.	Saitama	25 t/24 h	2009
Medical	Dubai Municipality, UAE	Dubai	19.2 t/24 h	2009
Medical & Industrial	Sorachi Kousan Co., Ltd.	Hokkaido	30 t/24 h	2010
Municipal	Tanegashima Area Regional Association	Kagoshima	22 t/24 h	2012
Municipal	Nishimonbetsu Area HSE Facility Association	Hokkaido	26 t/16 h	2012
Industrial	Toyokin Co., Ltd.	Aichi	34 t/24 h	2012
Disaster	Minamisanriku Area	Miyagi	285 t/24 h	2012
Medical & Industrial	Miyakonojyo-Kitamoro Area Seisou Kousha	Miyazaki	30 t/24 h	2013
Medical & Industrial	Marufuku Kougyo Co., Ltd.	Kagawa	30 t/24 h	2014
Municipal	Ito City	Shizuoka	142 t/24 h	2015
Municipal	Nagayo Togitsu Environmental Association	Nagasaki	54 t/24 h	2015
Medical & Industrial	Ogawa Econos Inc.	Hiroshima	30 t/24 h	2016
Medical & Industrial	Onomichi Kaihatsu Co., Ltd.	Hiroshima	46.9 t/24 h	2016
Medical & Industrial	Reprowork Co., Ltd.	Hokkaido	30 t/24 h	2016
Industrial Waste	Modern Asia Environmental Holdings Pte Ltd	Singapore	36 t/24 h	2017
Industrial Waste	Kushiro Kouseisya Ltd.	Hokkaido	20 t/24 h	2019
Municipal	Gero City	Gifu	60 t/24 h	2019
Municipal	Mitsuke City	Niigata	38 t/16 h	2019
Municipal	Goto City	Nagasaki	41 t/24 h	2019

\*1 Delivered an additional line of 42 tpd in 2000. \*2 Delivered additional two lines of 30 tpd in 2013 and 2019 respectively.





### **The largest Vertical Combustor (VC) plant ever built**

- Location: Miyagi, Japan
- Waste type: Disaster waste
- Capacity: 285 tons / 24 hours
- Completion: 2012

Contributed in recycling disaster waste from the Great East Japan Earthquake in 2011



### **The largest Medical Waste Incineration Plant in Japan**

- Location: Tokyo, Japan
- Waste type: Medical waste
- Capacity: 100 tons / 24 hours
- Completion: 2007

Awarded by the Japan Institute of Energy in 2017 for its achievement of recovering energy from medical waste



### **The first VC introduced outside Japan**

- Location: Dubai, UAE
- Waste type: Medical waste
- Capacity: 19.2 tons / 24 hours
- Completion: 2009

Fulfilled EU emission standards with dry-type Turbo Chemical Baghouses



### **The first VC introduced in South East Asia**

- Location: Tuas, Singapore
- Waste type: Industrial waste
- Capacity: 36 tons / 24 hours
- Completion: 2017

The most compact plant built on approx. 300 m<sup>2</sup> land area

## **Notable Projects**

In recognition of our innovative technologies



**Cutting Edge**



**Cutting Edge !!**

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**Performance Proven for the Future**