

1. Product Overview

Waste is incinerated for hygienic treatment, and weight and volume reduction for ease of final disposal. Each type of waste, however, varies in property and shape, and consequently, a separate incinerator designed correspondingly for various types of waste has been demanded previously. On the contrary, this Vertical Combustor (see Fig. 1) is capable of burning various types of waste stably and completely without leaving unburned with a single furnace.

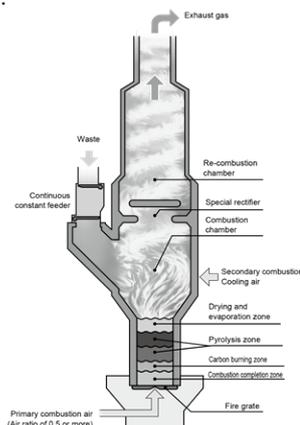


Fig. 1 Basic Construction

2. Background of Product Development

A conventional stoker type incinerator that has been most widely used since the 1960s for incineration of municipal solid waste incorporates a metal casting moving grate (called *stoker*) on which waste is wide-spread thinly (with a thickness range of 100 to 300 mm). Air is supplied from the bottom of the stoker to burn the waste while the high-temperature radiant heat of the combustion is utilized to incinerate the waste entirely spread onto the stoker. The waste on the stoker is dried, burned, and after-burned while it is transferred to the ash discharging chute. However, this system has a problem; that is, easy-to-burn plastics, paper, and textiles in the waste are combusted immediately after they are supplied, and only such waste part where they burn abruptly and violently in the incinerator is extremely heated up (and damages the incinerator), while difficult-to-burn waste remains unburned and is discharged as it is.

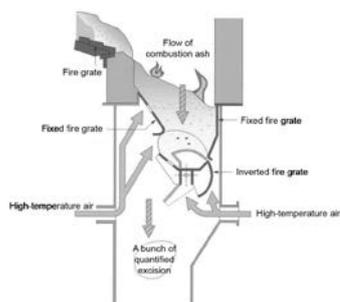


Fig. 2 Combustion-completing Device

As a countermeasure to the above stated common problem, a combustion-completing device (see Fig. 2) was firstly developed. In the stoker furnace equipped with the same device, waste is spread out on the grate not thinly but thickly with the thickness of 400 mm-1,000 mm, and the waste in upper layers is dried and combusted by high temperature gas generated by combustion of the waste in lower layers. In addition, incineration ash is accumulated vertically at the tail end chute part of the stoker furnace, and the unburned material remained in the incineration ash is burned throughout as embers by high temperature air supplied from the bottom. The incinerator with this device secures adequate time for slowly combusting difficult-to-burn waste, and

hence, is making it possible to reduce ignition loss (unburned residue amount) as compared with conventional incinerators. The development of this combustion-completing device showed excellent results and lead to the development of the Vertical Combustor which vertically integrated those drying, burning and after-burning zones of convention stoker type incinerators (see Fig. 3).

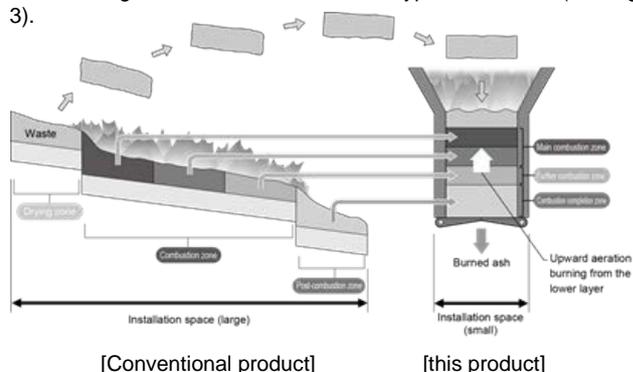


Fig. 3 Comparison of Conventional Products with This

3. Combustion Mechanism

Primary combustion air, the amount of which is lower than 1/2 of theoretical combustion air amount, is supplied from the bottom of the Vertical Combustor in order to decompose the waste deposited on the grate located in the bottom of the furnace. Then secondary combustion air is supplied to a chamber above the waste layer to burn the pyrolysis gas in the incinerator completely. This product mixes and stirs the pyrolysis gas and secondary combustion air sufficiently, thus making it possible to achieve easier combustion control. Furthermore, a special rectifier is provided between the combustion chambers and the post-combustion chamber in the incinerator to improve the mixing and stirring performance of the pyrolysis gas and the secondary combustion air for complete combustion of unburned gas, thus effectively suppressing the generation of dioxins.

4. Product Features

This product is capable of stably and perfectly burning any types of waste, including municipal solid waste, industrial waste, medical waste and sludge with various properties and in a wide range of shapes. A locally high-temperature or low-temperature part inside the furnace, which has been a problem in the conventional stoker incinerator, does not arise during operation of the Vertical Combustor. Hence, this combustion mechanism suppresses clinker formation on inner surface of the furnace and minimizes the generation of dioxins. The product is of cylindrical, simple construction and space-saving, and has high durability since the grate is never exposed to high temperature due to combustion process.

5. Sales Records

The first unit was delivered in 1994 (to Kyoto University Hospital), and so far PLANTEC Inc. have received orders for the total 38 incinerators in 29 facilities for disposal of municipal solidwaste, industrial waste, medical waste and disaster waste.

6. Summary

The Vertical Combustor was developed through the long-term effort on research & development based on 151 plants experience. It is also the technology realized by half a century history responding to the treatment needs for various types of waste and changes in waste quality. Plantec wish to contribute to the development of a recycling society by continuously extending this technology to the broader fields and market and committing to further technology development.