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### SYNCOM-Plus – An Optimized Residue Treatment Process

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#### ABSTRACT

In a large-scale pilot plant, studies on wet-mechanical treatment of bottom ash using the SYNCOM-Plus process were carried out by MARTIN GmbH in the SYNCOM waste-to-energy plant in Arnoldstein, Austria (approx. 11000 kg/h waste throughput). Granulate of > 2 mm and fine fraction of < 5 mm were produced by dry screening, washing and wet screening. Additionally, sludge was separated from the wash water. The fine fraction and sludge as well as the boiler ash were recirculated into the furnace.

In conclusion, the SYNCOM-Plus process meets all requirements which need to be complied with in an optimized and effluent-free commercial residue treatment process for the recovery of industrial products.

This paper documents successful continuous operation of the SYNCOM-Plus process in direct connection with bottom ash discharge as well as the effects on combustion, flue gas composition and residue qualities.

**Keywords:** Waste-to-Energy, SYNCOM-Plus, bottom ash, residues, wet-mechanical treatment

#### 1. INTRODUCTION

Bottom ash produced during thermal waste treatment accounts for the largest mass flow of the waste input at approx. 25 % by weight. In Europe, this bottom ash is currently used as a building material, e.g. in road and landfill construction, or as a mining filler, e.g. in salt or coal mines. However, a considerable percentage is sent to landfills because compliance with certain quality criteria cannot be ensured.

MARTIN GmbH (<http://www.martingmbh.de>) has developed the SYNCOM process, in which combustion air is enriched with oxygen, so that fuel bed temperatures are considerably higher, thereby causing increased sintering of the bottom ash. To further improve bottom ash quality, the SYNCOM-Plus process was developed, whereby a downstream wet-mechanical treatment process to separate a granulate (Figure 1) is added to the SYNCOM process.

The separated fine fraction and sludge (Figure 1) as well as the boiler ash are then recirculated to the combustion system for further sintering and the destruction of organic compounds.

The goal of the trials was to implement a compact large-scale pilot plant consisting of selected units for the continuous wet-mechanical treatment of bottom ash as well as recirculation of fine particles and boiler ash into the combustion system in the SYNCOM waste-to-energy plant in Arnoldstein, Austria.

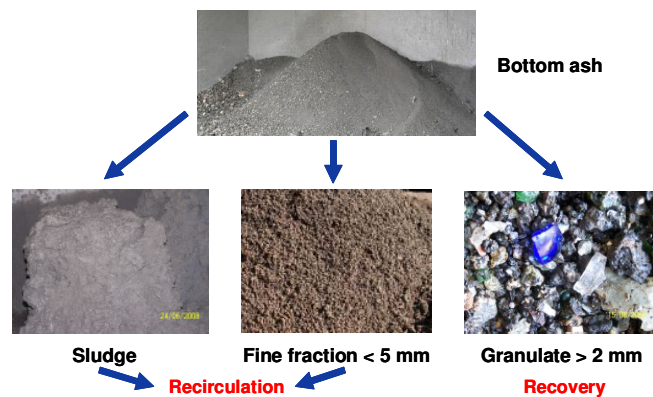


Fig. 1 Material flows

#### 2. CONCEPT / PILOT PLANT / TRIALS

A compact large-scale industrial pilot plant consisting of selected units for the continuous operation of wet-mechanical bottom ash treatment and recirculation of fine particles was implemented and optimized. The concept is shown in Figure 2.

The continuously accumulating bottom ash flow coming from a wet-type discharger was first dry screened to separate a fine fraction of < 5 mm, then washed and wet screened to separate a granulate of > 2 mm and a suspension in a double deck screening machine. Because the wash water was circulated, any particles < 2 mm contained therein had to be completely separated in order to minimize the addition of fresh water. A decanter centrifuge was used for this purpose. The sludge that accumulated was fed into the combustion system; the particle-free wash water was conveyed into a storage tank for washing and wet screening.