

Waste incineration plants

AIK processes related to waste incineration

Waste water treatment, FAW- Process and FLUREC-Process...

Waste incineration with recovery of recyclable materials by means of AIK processes and technologies – such as zinc recovery from fly ash and pollutant elimination from waste water or even mercury removal or heavy metal removal – is the main focus of our range of services.

From residual material to raw material – that's why we invest every year in new technological developments as well as in the optimisation and further development of existing plants, components and processes. In doing so, we systematically focus our efforts on new processes to increase innovative strength and on existing processes and procedures to make operating procedures more efficient and reduce material and energy requirements. Our plants embody sustainability, real value creation for the economy, energy and the environment.

For this reason, we are now a sought-after partner, consultant and plant constructor for public authorities, special-purpose associations and various branches of industry in the private sector when it comes to closing material cycles and implementing residue and wastewater treatment plants as well as soil treatment plants. As a plant constructor, AIK Technik AG currently services 26 of a total of 30 WIPs in Switzerland and many more abroad. Learn more about it in our references.

Waste incineration or garbage incineration is the burning of the atmospherically combustible parts of waste for the purpose of inerting the material, i.e. the material is converted into different substances that are stable and can be landfilled. In addition to primary energy in the form of "heat / thermal energy", which is converted into electrical energy, steam and district heating, other "flows" are produced. One of these is fly ash or also called filter ash. The fly ash consists of particles that fly up with the combustion air and are produced in the various stages of flue gas treatment. This part amounts to about 2% of the incinerated waste volume. In Switzerland, the fly ash is acid washed, using the technology from AIK Technik AG for the purpose of recovering the heavy metals, especially zinc – see also Filter and Fly Ash Washing (FAW). The so-called FLUREC process is also available for this purpose. The washed ash is then landfilled. The so-called FLUREC process with the recovery of pure SHG zinc is also available for this purpose.

Another stream consists of the chemical liquid additives that absorb undesirable substances in the course of cleaning the flue gases and have to be treated accordingly. These are cleaned in the wastewater treatment plant (WWT) using the technology from AIK Technik AG and can then be fed into an ARA or returned to the environment.

... Mercury separation and candle Filtration

The incineration process also produces slag (approx. 20% of the incoming waste), which is extracted during the grate and contains solid rock-like material as well as ferrous and non-ferrous metals. The slag is processed, separating and collecting ferrous scrap as well as elemental aluminium, copper and brass. Afterwards, when all recyclable materials have been removed, it is landfilled.

Concerning waste incineration plants there are the following relations:

- Household waste
- Sweepings
- Recycling
- Disposal
- Material recycling
- Collection points
- Circular Economy
- Recycling economy
- Raw material extraction from household waste
- Urban Mining
- Fly ash
- Flue gas cleaning

Do you have questions about waste incineration plants and the processes used for them?

Write to us. We look forward to getting to know you.

[Send mail request](#)

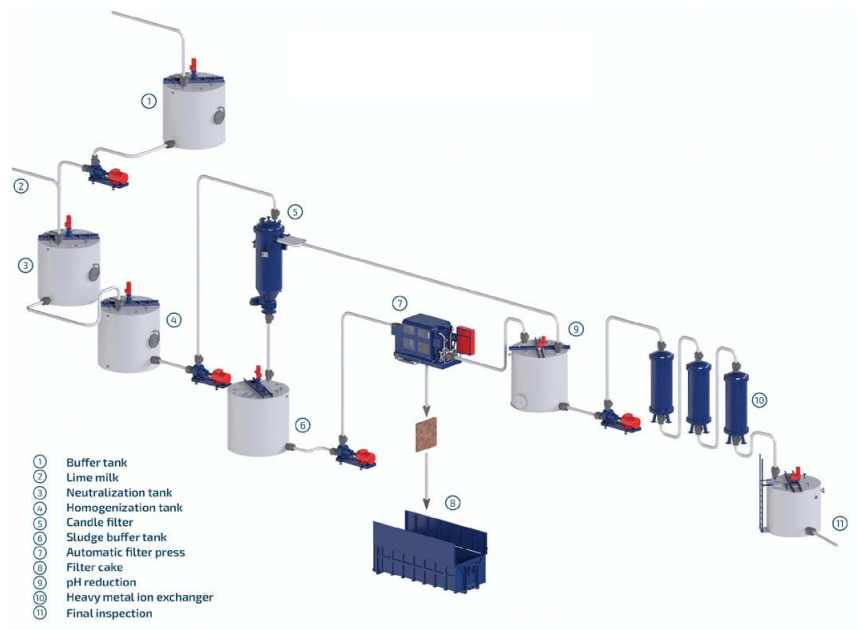
Following are some processes in detail.



Waste water treatment (WWT)

The wastewater streams generated in a waste incineration plant must be cleaned so that they can then either be returned directly to the environment or fed into a public sewage treatment plant. One of the goals of cleaning wastewater in a waste incineration plant is thus to precipitate the heavy metals contained in the wastewater and return them to the recycling economy.

The resulting hydroxide sludge is dewatered via filtration systems and, in the case of a preceding FLU-WA process, fed to a metal smelter as a secondary raw material for zinc production. The residual separation of heavy metals is carried out by downstream selective ion exchangers, which result in wastewater free of suspended solids and heavy metals that -meets all the requirements of the Swiss Water Protection Ordinance and can be discharged into receiving waters without any problems.

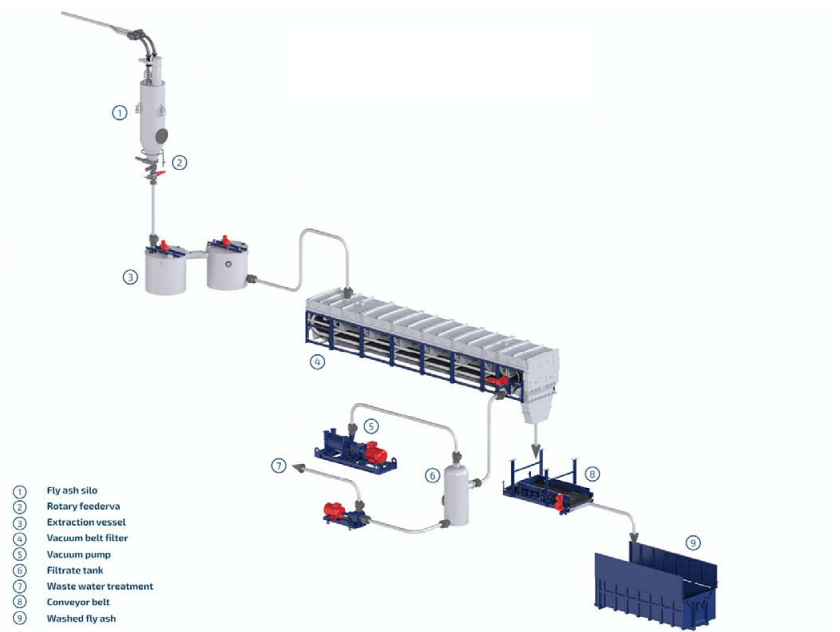


Filter and fly ash washing - FAW (FLUWA by AIK®)

Acidic filter and fly ash washing (FAW) forms the core of the AIK systems. In this process, zinc, copper, cadmium, lead and other metals are efficiently removed from the filter and fly ash in the extraction process after mercury separation in the acidic laundry wastewater. For the best economic and ecological utilisation, the FAW process exploits the synergies

Currently, the FAW process is used to treat more than 50% of the filter ash load generated throughout Switzerland. According to the motto "recycling before landfilling", the FAW process enables the recycling of heavy metals and minimises the amount of residue to be landfilled.

of the filter ash and laundry wastewater residues produced during wet flue gas cleaning. The result is secondary raw materials. After treatment, the remaining fly ash can be disposed of together with the slag in an environmentally friendly manner and without any problems at a landfill site.

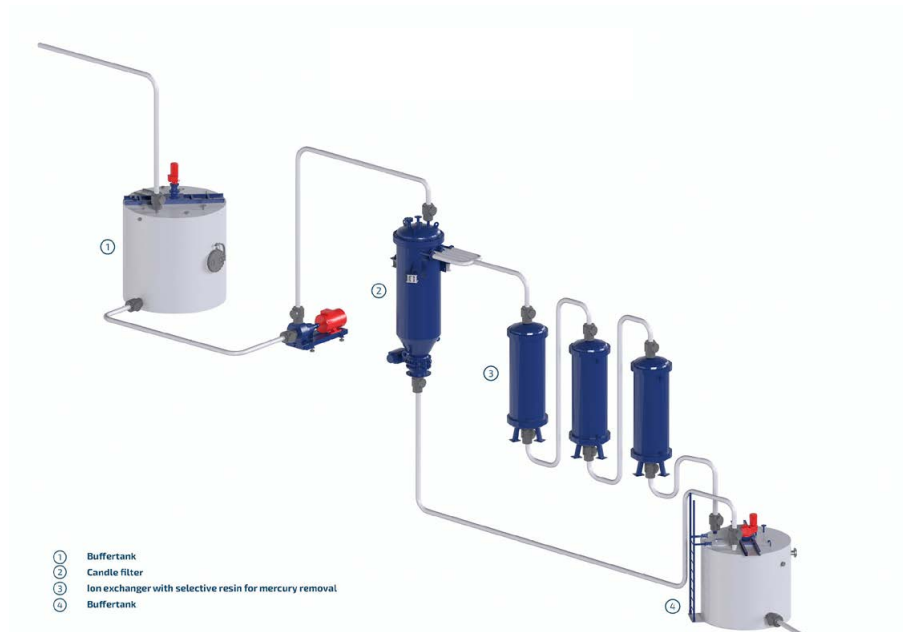


Filtering of blowdown water | quench water and mercury separation

The process water to be treated (acidic laundry wastewater or quench water, neutral laundry wastewater) from flue gas cleaning contains mercury, which is removed from the system in the first process stage. The process is based on two phases: pre-filtration of the laundry wastewater, followed by mercury removal via selective ion exchange columns.

In the process, approx. 98% of the mercury introduced into the waste incineration is removed, thus falling well below the limit values in the wastewater – an environmentally sound process that can be widely used in various branches of industry.

The pre-filtration of the laundry wastewater significantly improves the mercury removal efficiency of the ion exchanger. Thus, high loading densities can be achieved with selective ion exchange resins. The size of the components used always depends on the amount of wastewater to be treated.



Filtration with candle filter

AIK cartridge filters are used to filter solids from acidic, neutral or alkaline liquids. The AIK cartridge filters are particularly suitable for the filtration and dewatering of inorganic substance mixtures. The liquid mixed with solids is pumped into the cartridge filters. The liquid flows through the filter cartridges from the outside to the inside (outside-in method).

This causes a filter cake to form on the filter surface. This filter cake also acts as a filter medium.

After a certain flow rate or a defined filtration pressure has been reached, filtration is interrupted and the resulting filter cake is blown off the inside of the filter cartridge with compressed air. In the case of dry discharge, the cartridge filter is emptied by means of compressed air before being blown off. When the candle filter is dry, the ejected filter cake falls through the discharge flap directly into the container, big bag or bin provided. In the case of wet discharge from the candle filter, the filter cake is discharged through a diaphragm valve via the discharge line for dewatering.



Zinc recovery FLUREC process

FLUREC stands for "fly-ash recycling". With this process, pure zinc can be recovered from the ash of waste incineration. Large quantities of heavy metals end up in our waste every day. During incineration, they remain as residues in the slag and the exhaust gas cleaning system.

In other words, the fly-ash, consists of incineration smoke and very fine dust. The FLUREC process is a revolutionary technology for recovering lead, cadmium, copper and pure zinc from the ash for direct Sale.

First, the heavy metals are removed from the ash using the FAW process (fly-ash washing). Then, using the FLUREC process, the individual metals are separated and sold again as commercial products.

The advantages are obvious: operating costs can be reduced due to fewer residues, and on the other hand, the recovered zinc can be re-sold.

