INBA® System

Slag Granulation with Continuous Dewatering and Pollution Control
**Slag Granulation with the INBA Dewatering System**

Molten slag is often considered as a waste material when it is cast into slag pits.

INBA slag granulation and dewatering system is the proven route for converting molten slag into a value added product for the cement industry.

The INBA system comprises two main components – the granulation unit which utilizes a granulation tank with integrated blowing box, and the dewatering unit consisting of the INBA dewatering drum with integrated distribution system for an even slag sand distribution over the complete length of the drum. With more than 260 references, this most popular and effective means of processing blast furnace slag in the world today is rated as **Best Available Technology**.

**Flexibility of the INBA system**

The system provides you with an installation of high flexibility, independent from blast furnace operations, such as tapping time duration, inter-cast gap time, slag flow rates and many more.

The installation is designed for “on-line dewatering and removal” of the granulated slag sand through the INBA dewatering drum with its self-adjusting dewatering speed relative to the slag flow.

**Three different water circuits**

Paul Wurth designs INBA granulation plants on the basis of three different plant types to meet your specific requirements.

All systems can be configured in open or closed loop and allow a fully individual and flexible design.

1. Hot runner
2. Blowing box
3. Granulation tank
4a. Stack
4b. Condensation tower
5. Distributor & Slow down boxes
6. Dewatering drum
7. Hot water tank
8. Granulation water pump
9. Recirculation pump
10. Cooling tower pump
11. Cooling tower
12. Cold water tank
13. Condensation water pump
14. Buffer tank
15. Condensation water return pump
16. Make-up water
17. Drum cleaning water
18. Drum cleaning air
19. Conveyor belt
20. Stock pile
Multiple Layout Combinations

The INBA granulation system is a compact installation and suitable for applications with limited space. Granulation, dewatering and storage areas are physically independent and can be installed in remote locations. The system allows multiple combinations of granulation tanks and/or INBA dewatering drums adapted to your furnace design and requirements.

Slag Granulation Area: Granulation Tank & Blowing Box

The slag granulation area links the hot slag runner of the blast furnace and the INBA dewatering system. This link is directly accomplished through the use of a granulation tank.

The granulation tank creates a compact layout, which allows a reduced water circuit design with optimal heat transfer conditions in addition to better product quality.

Steam condensation and spray nozzles

Paul Wurth offers a counter-current condensation system in conjunction with a granulation tank and a sealing hood which provides a virtually air tight steam/water condensation. Diameter and tower height are defined as per thermal calculations.

The conversion of the condensation water into very fine water droplets is performed with wear resistant spray nozzles.
Dewatering Process

The granulated slag and water mix is distributed evenly over the whole length of the drum. Axial vanes inside the drum continuously lift the slag sand onto a conveyor belt for immediate evacuation. The fine mesh on the exterior of the drum retains the slag sand and allows the water to filter through. The slag sand layer in the bottom of the drum creates a self-filtering effect.

1. Dewatering drum
2. Distributor & Slow down boxes
3. Buckets
4. Conveyor belt
5. Purging water
6. Purging air
7. Supporting & Filtering screens
8. Slag sand layer
9. Hot water tank
10. Overflow runner system

Drum and drum feedings

A range of drum dimensions along with appropriate drum feedings handle the different demands of varying slag and water flows. In view of a longer life time, feeding outlets are equipped with ceramic tiles. A range of various wear protection linings are available for the feeding components of the drum.

Advantages of the dewatering drum

- Low wear on drum body
- Life time in excess of one BF campaign
- Low content of suspended solids in the circulation water
- Evacuation of slag wool via conveyor belt
- Indication of slag flow rate via measurement of torque on the drum

The proven drum drives

Paul Wurth offers an electric or hydraulic option, two different proven technologies for the drum drive. The electric drum drive with its frequency controlled electric drive motor has proven to be very reliable on many plants. The hydraulic drum drive with its very compact drive unit provides a high torque even at low drum speed.

Sand storage with stock piles or storage hoppers

Different solutions are possible:

- Slag sand storage onto a stock pile and removal with loader and truck.
- Intermediate storage into slag sand storage hoppers with discharge possibility either into trucks, railway cars, conveyor belts or a combination of this.
Cooling Tower

Cooling towers of Paul Wurth design allow a strongly reduced maintenance operation compared to standard cooling towers. The "packless" countercurrent design prevents particles from agglomeration and has proven itself in numerous plants.

Product Quality

Product quality is defined through the sand glass content and the average slag sand particle distribution. Tendencies of the product quality have been identified as a function of the chosen plant configuration. With more than 250 granulation plants built worldwide, Paul Wurth engineers gained the know-how to give your product the highest possible value.

Applications in the Non-Ferrous Industries

The INBA Dewatering System is fully applicable in the Non-Ferrous Industries for many different products, like lead-zinc bullion from kivetc furnaces, nickel, lead and zinc slag from smelting furnaces, blister copper from ISA-smelt type furnaces, platinum slag from smelters, nickel slag from pierce smith converters, etc.

The installations are adapted in size and process parameters to the adequate process requirements.

Main advantages of the INBA system

- **Very compact design** offering maximum flexibility in the layout of installations adjacent to the cast-floor of the blast furnace. With an adequate layout of the hot runners on the castfloor, or through the introduction of an additional remotely located second granulation tank, one granulation unit can handle the slag of two tap holes.

- **Continuous filtering and evacuation** of dewatered slag sand up to its storage facility without interruptions for purging.

- **High reliability.**

- **Measurement of slag flow**, due to the design of the drum and the dewatering process.

- **Flexibility of the plant operation** to be largely independent from blast furnace operations, such as tapping time duration, inter-cast gap time, minimum and maximum slag flows, etc.

- **Air pollution control** through closed loop granulation and reduced emissions.

- **Low investment costs** compared to the filter bed and static dewatering systems.

- **Low maintenance cost** due to low wear.

- **Low operation cost** due to low energy consumption, simple design and fully automatic operation.
The Paul Wurth Group is today one of the world leaders in the design and supply of complete plants, systems and processes as well as specialised mechanical equipment for

- **the iron & steel industry:**
  - Blast Furnaces & Auxiliary Plants
  - Coke Making Plants
  - Agglomeration Plants
  - Direct Reduction Plants
  - Environmental Protection, Recycling & Energy-Saving Technologies

- **other industries:**
  - Systems & Equipment for Non-Ferrous Pyrometallurgy, Electrometallurgy & Residue Treatment
  - Intralogistics Solutions for Heavy Loads
  - Engineering & Project Management for Civil Construction and Infrastructure Projects


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