SINTERA™ Concept

Sintering Plants
Our solutions meet your challenges

Operators of iron ore sintering plants have to cope with different challenges that directly impact their plant’s productivity, product quality, operational costs, and consequently influence the downstream blast furnace operation. These challenges depend on fluctuating external factors and on the operator’s economic targets.

- Due to the continuously decreasing quality of the iron ore available on the worldwide market (i.e. increasing ultra-fines proportion), it becomes more and more difficult to operate at high productivity levels and produce a sustainable BF burden quality (low RDI, high cold strength, appropriate size and size distribution).

- Keeping the operating costs as low as possible is a permanent challenge for any operator.

- More stringent environmental requirements (i.e. dust emissions, \( \text{SO}_2 \), dioxins, \( \text{NO}_x \)) are additional challenges, especially when upgrading existing plants.

Thanks to our high and long-term expertise

- in raw materials, BF burden and BF operation,
- in operation and process optimisation, and
- in gas treatment plants,

Paul Wurth is able to provide appropriate technical solutions from the raw mix preparation to the sinter cooling and the treatment of all effluents, coupled with the corresponding advanced automation systems.

Paul Wurth Sintegra™ Concept

Our global approach is based on:

- the integration of the entire expertise required along the blast furnace route,
- the integration of our multi-disciplinary know-how, and
- the consideration of the external constraints and trends impacting any sintering operation.
Sintegra™ Technology

1. Raw mix preparation

To achieve high productivity and a consistent good sinter quality, an excellent homogeneity and high permeability of the sinter raw mix are required from the start. To cope with the challenging raw material input (increased ultra-fine iron ore proportion, by-products like dust & sludge generated from steel plants, varying qualities of solid fuels and additives, etc.), Paul Wurth offers tailor-made solutions for mixing and nodulizing. For example, the integration of an intensive mixer with a drum nodulizer or the implementation of an intensive mixer together with an intensive nodulizer, depending on what ranges of raw materials the operator is using, on the material characteristics and on the available space for pre-blending/blend-yards.

In addition, we supply an advanced system for raw mix charging onto the sinter strand, designed to reduce material compression and to ensure adequate segregation during discharge for a subsequent optimal ignition.

- Pre-blending, intermediate storage / stockyard design
- Storage bins designed to material characteristics, avoiding bridging and ensuring proper outflow segregation
- Mixing and nodulizing solutions adapted to iron ore and fluxes qualities
- Charging station for optimised segregation and good permeability of raw material mix on sinter strand
2. Sintering process and sinter machine

The solutions offered by Paul Wurth at the sintering stage aim at reaching high productivity and producing good final sinter with optimised energy consumption.

- From 75 to 500 m² for integrated steel plants
- From 15 to 90 m² for mini-BF’s
- Optimised ignition furnace concept with vertical burners for optimal heat distribution and transfer along with reduced fuel consumption
- Strand sealing concept for minimum leakage and reduced false air ingress leading to lower energy consumption
- (Optional) pallet car widening for production capacity increase
- Moving parts designed for reduced wear

3. Output processing

Processing and screening of hot and cold sinter requires heavy-duty equipment which needs only reduced maintenance. For example, the hot crushers are equipped with replaceable wear elements on the grizzly bars and can be pulled out of the hot sinter discharging area together with the water-cooled crusher shaft on a movable cart.

For the screening of the cold sinter product, the screens by Paul Wurth are especially designed to avoid clogging.
4. Sinter cooler

Paul Wurth offers different types of sinter coolers, i.e. linear, annular and shaft coolers, along with an optimised cooler charging system. This ensures a homogenous distribution leading to increased cooling efficiency, better heat transfer conditions, lower dust emissions and reduced energy consumption.

- Annular cooler, with a sturdy casing and a segmented grid lowering trough concept, ensures an easy and sustainable centring and is equipped with a performing air sealing
- Shaft cooler, with minimum space requirement and longest sinter residence time, ensures low sinter outlet temperatures with least cooling air flows. The sinter is continuously discharged by a stripper. Our design with dedicated air outlets enables a good air separation for optimised heat recovery
- All coolers can be equipped with a heat recovery and dedusting system

5. Off-gas treatment

Paul Wurth’s technologies range from off-gas reduction via waste gas recirculation (simultaneous fuel and emission rate reduction) to individually adjusted off-gas treatment systems, like the EFA™ process, enabling simultaneous removal of acid gas components (HF, HCl, SOx...), dioxins, furans and dust. Similarly, NOx and CO reduction plants are adaptable to fulfill local constraints and regulations. These customised and economic solutions (as end-of-pipe solutions or integrated solutions) ensure that sinter plants are operated in accordance with increasingly strict environmental regulations at lowest possible operating costs and without impacting the efficiency of the sinter process itself.

- ESP, cyclone, bag filter, DeSOx and DeNOx systems, CO reduction plants, combined techniques like the EFA™ system
- Selective off-gas treatment
- Energy recovery by preheating of suction air
- Waste gas recirculation resulting in reduced emission loads, hence lower investment and operational costs for end-of-pipe off-gas treatment solutions
6. Process control & Automation

SINTERXpert™ is Paul Wurth’s integrated Level-2 process control, optimisation and on-line expert system for smooth sinter plant operation. The powerful models, features and specific instrumentation assist the operator in the fulfilment of his operational targets and optimisation of the complete sintering process.

- Mix Calculation Model
- On-line Mass balance
- HMI, Trending & Reporting
- Burn-through point Model
- On-line Expert System:
  - Fume temperature control
  - Fines bin level control
  - Moisture control of the mix
  - Charging control
  - Strand speed control
  - Sinter quality control
  - Solid fuel rate optimization
7. Revamp / Modernisation of existing sinter plant facilities

- Integration of new intensive mixing and nodulizing station to cope with increasing ultra-fine proportion of iron ore feed material
- Integration of adapted charging system for adequate segregation at discharging and good permeability of raw mix onto the sinter strand
- Integration of up-to-date ignition hood and burner concept for improved ignition and reduced fuel consumption
- Integration of adequate sinter discharging into sinter cooler for optimal permeability, improved cooling efficiency and minimum dust emission
- Integration of new sinter cooler with increased capacity on existing foundations
- Implementation of waste gas recirculation for fuel and emission reduction
- Implementation of up-to-date off-gas treatment for selective emission reduction—system integration and/or end-of-pipe solutions
- Increase of effective suction area by pallet car widening

SuPerMagnag™ for online measurement of the sinter quality evolution with short response time, allowing an optimisation of the sinter energy consumption.
Engineering & Technology worldwide

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
- Integrated Automated Handling & Storage Solutions
- Civil & Environmental Engineering


---

© Copyright 2013 Paul Wurth S.A. – all rights reserved

Non Contractual Data: Paul Wurth believes that the data contained in this folder are correct and accurate, but cannot guarantee same or better performances for any specific site without a detailed quote. Patents and Patents pending. — Paul Wurth equipment and processes are protected in many countries by patents.

Paul Wurth, the Paul Wurth Logo, EFA, Sintegra, SinterXpert and SuPerMagnag are trademarks of Paul Wurth S.A. and may be registered in your jurisdiction.