Blast Furnace Plants

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:

- 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


Bell Less Top® – The Charging Solution
A vital system to meet today’s blast furnace operation challenges

Variability in raw materials, high coal injection rates, and reduced CO₂ emissions can only be managed, by controlling burden distribution and segregation. More than ever, these factors emphasise the central role of the Bell Less Top charging system (BLT®) in blast furnace operations.

Since 1972, more than 700 units have been delivered worldwide.

Bell Less Top charging systems provide the following benefits:

- **Safety** is increased during maintenance work, no work inside the blast furnace.
- Reduced operating expenses (OPEX).
- Coke consumption savings achieved through increased pulverised coal injection levels, higher flexibility in raw material usage and increased blast furnace top pressure.
- Better blast furnace **performance** as a result of precise burden distribution.
- Smoother blast furnace operation with an added benefit of reduced variability of Si-content in the hot metal.
- Control of wall heat losses from better charging results in increased lifetime of cooling elements or refractory lining, in turn leading to longer blast furnace **campaign lifetime**.
- The Paul Wurth Bell Less Top is a reliable and **proven technology**.
Bell Less Top – The solution for burden distribution and segregation control

The Bell Less Top System provides:

- High burden distribution flexibility
- High circumferential uniformity
- Reduced grain size segregation

Bell Less Top primary components:

1. Main conveyor
2. Distribution rocker
3. Upper seal valve
4. Material hoppers
5. Material gate casings
6. Lower seal valve casing
7. Isolation valve
8. Chute transmission gearbox
9. Distribution chute
The Paul Wurth Bell Less Top Family, ideal for blast furnace volumes between 250 m³ and 6000 m³

Paul Wurth has created a complete Bell Less Top family providing charging systems for any blast furnace configuration and size.

The Bell Less Top Family is complemented by Paul Wurth gearboxes and allows for easy retrofit on bell top charging systems.

The gearbox line-up has been upgraded to include the new pressurised cooling (PC) system. The PC system provides higher cooling efficiency, is maintenance free and is instrumental in the reduction of nitrogen consumption.
BFXpert™ models’ for the Bell Less Top charging system

BFXpert™ models¹ for the Bell Less Top charging system

- Burd-i™
  - Burden calculation and charging recipe definition for stockhouse and Bell Less Top.
  - Integration of all charging steps and validation in one easy-to-use application.
  - Minimised effort and resources.
  - Avoids charging related incidents by elimination of input errors.

- Shaftrack™
  - Tracks the position of batches.
  - Calculates the burden descent speed.
  - Provides complete burden information.
  - Predicts production.
  - Optimised fuel rate adaptations = Lowered coke rate.
  - Optimised positioning of coke blanks = Optimised coke consumption.

- Blt Condition Monitoring
  - Simulates layer structure, ore to coke ratio and porosity across the blast furnace radius.
  - Estimates the cohesive zone shape and position.
  - Reduces the number of iterations needed to find the most suitable charging pattern for the required blast furnace operation.

- Condition Monitoring
  - Continuous survey of your equipment condition:
    - Monitoring of all Bell Less Top and major blast furnace related signals.
    - Dedicated vibrational analysis of gearbox.
    - Early detection of anomalies with automatic warnings and alarms.
    - Data analysis & visualisation.
    - Automatic reporting.
    - Efficient corrective maintenance.

These dedicated BFXpert models are designed to make best use of the Bell Less Top and optimise blast furnace performance.

¹ Models also available as standalone products

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