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**THE CIRCLE OF FLEXIBILITY**  
CIRCULAR PELLETIZING TECHNOLOGY

# A SOLUTION FOR FLEXIBILITY

## REVOLUTIONARY DESIGN

The complete plant is as small as a dip-rail sinter cooler and can be easily and cost-efficiently integrated within an existing steelworks. In comparison with conventional pelletizing plants that are assembled on a massive structural platform, CPT is distinguished by its circular design with a low building profile and small overall footprint. The induration process is designed on the basis of pot grate tests for each ore type to be used. The latest 3D design and engineering tools are employed to ensure an optimum plant performance featuring maximum heat utilization.

## FLEXIBLE OUTPUT

CPT is currently available in two plant modules with output ranging from 0.6 to 3.5 million t/a of high quality DR- or BF-grade pellets.

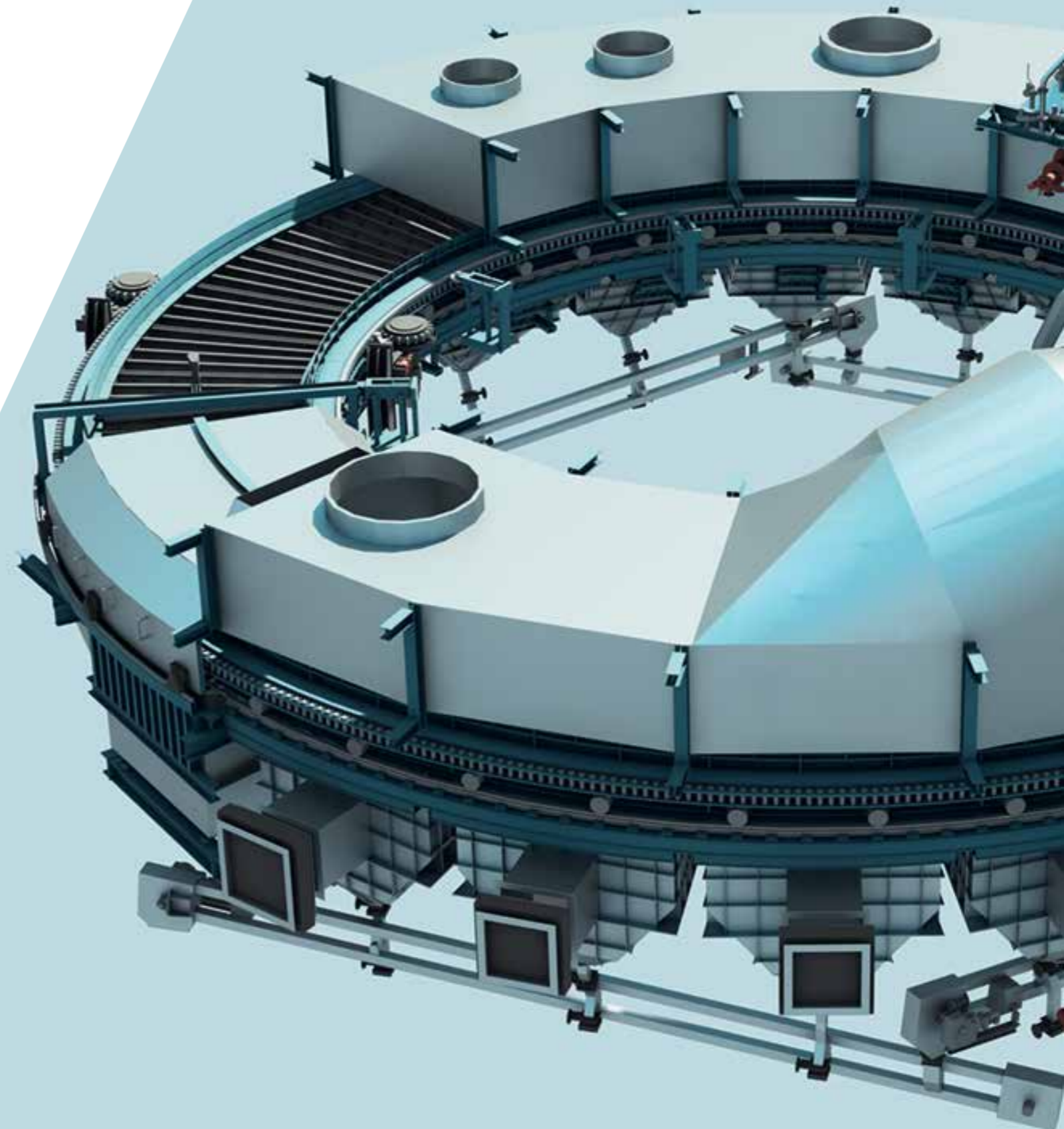
## FAST CONSTRUCTION AND EFFICIENT EQUIPMENT UTILIZATION

The induration cycle of a CPT plant is the same as in a straight-grate system. However, thanks to its circular design, the footprint of the CPT induration furnace is much smaller. A low building profile and simplified plant layout allow construction work to be carried out more quickly and efficiently compared to conventional plants. Contrary to straight-grate systems where one-half of the induration grate is returned empty to the charging station, the circular-grate design of a CPT plant means that the equipment utilization can be fully optimized. Not only can the required grate length for a given output be significantly reduced with CPT, energy costs are also reduced. This lowers both investment and operational expenditures.

## AUTOMATION AND MAINTENANCE

The CPT plant is operated from the central control room by means of most advanced automation and control systems. The pallet cars can be easily removed and exchanged during short-term maintenance intervals.

Primetals Technologies has combined the best of both worlds – the well-proven traveling-grate process with the simple, compact, and robust mechanical design of a circular dip-rail cooler. The result is a revolutionary pelletizing technology that significantly reduces the size of a typical pellet plant. CPT is by far the world's most compact pelletizing plant and represents a milestone in minimum-cost iron production with in-house-made pellets.





#### ADVANTAGES OF CIRCULAR PELLETIZING TECHNOLOGY

- Proven process technology as utilized in straight-grate pelletizing plants
- Induration furnaces with pellet output capacities between 0.6 and 3.5 million t/a
- Extremely small footprint and low space requirement
- Highly efficient utilization of circular-grate equipment - only 25% of pallet cars not inside the furnace
- Low operational expenses due to flexible use of various energy sources for firing process (e.g. indigenous coals, liquid and gaseous fuels)
- No waste materials due to 100% recycling loops of all input materials

# THE CIRCLE OF FLEXIBILITY

## **FLEXIBILITY IN INVESTMENT**

Circular Pelletizing Technology (CPT) from Primetals Technologies offers pellet producers decisive benefits compared to large-scale pellet plants. The low capital expenditures and specific investment costs of CPT provides iron and steel producers and also operators of iron ore mines the flexibility required to expand production capacity to meet increasing market demands.

## **FLEXIBILITY IN LOGISTICS**

CPT is the world's most compact pellet plant. This is the result of a space-saving circular plant layout with a low building height. CPT offers producers a viable option to integrate pellet production directly at the steelworks site. This leads to greater production flexibility, independence from pellet suppliers, and lower pellet costs due to the elimination of external transport logistics.

## **FLEXIBILITY IN SIZE**

In addition to its compact circular layout and innovative building structure, CPT is characterized by its modular design and output options. Pellet producers can select from two plant modules ranging from 0.6 to 3.5 million t/a, on the basis of available iron ores and desired production capacity.

## **FLEXIBILITY IN LOCATION**

CPT plants can be built either at the mine site or seamlessly integrated within existing steelworks or direct-reduction plants. This offers greater freedom in optimizing supply logistics and production workflows.

## **FLEXIBILITY IN TIME**

The integration of CPT within the steel production process not only optimizes pellet logistics and costs, it makes just-in-time production possible. This ensures that pellets are available exactly when they are needed, thus reducing transport and storage costs.

## **FLEXIBILITY IN OUTPUT**

A CPT plant provides producers with the flexibility to manufacture both high-quality blast furnace or direct-reduction pellets with the respective chemical and mechanical properties. The CPT plant is also capable of processing manganese ores.



# THE INDURATION PROCESS

## MINIMIZED ENERGY CONSUMPTION AND ENVIRONMENTALLY COMPLIANT

The induration cycle requires approximately one hour and includes several process steps featuring the intelligent reuse of hot gas. This greatly reduces the overall energy consumption. The waste gas from the hood exhaust and the wind box exhaust fans are continuously cleaned to fully meet environmental requirements.

### ZONE 1: UP-DRAFT DRYING

Hot gases recuperated from the second cooling zone are used for drying the green pellets charged onto the CPT pallet cars. After passing through the pellet bed, the cool, humid air is exhausted by the hood exhaust fan and then conveyed either through an electrostatic precipitator (ESP) or bag filters before it is emitted to the atmosphere via a stack.

### ZONE 2: DOWN-DRAFT DRYING

The hot gases recovered by the wind box recuperation fan from the firing and after-firing zones are sucked through the green pellet bed from the top to the bottom by the wind box exhaust fan. This completes the drying cycle. These gases, together with the gases from the preheating zone, are then ducted through an ESP or bag filter to the stack.

### ZONE 3: PREHEATING

The main source of heat is supplied by gases recuperated from the firing zone, supplemented by burners on each side of the machine.

### ZONE 4: FIRING

The hot gases from the first cooling zone are additionally heated by burners installed on each side of the CPT plant. The gases are then used to heat the pellets to the induration temperature of up to 1,350°C. This results in recrystallization and slag bonding that gives the pellets their compressive strength.

### ZONE 5: AFTER-FIRING

Hot gases from the cooling zone are sucked through the pellet bed. The heat front is pushed through the bed to the hearth layer. This completes the induration process.

### ZONES 6 AND 7: FIRST AND SECOND COOLING

The cooling air is heated up when passing the pellet bed in the cooling zones. The cooled pellets exit the induration machine at 100°C or less.



## THE WORLD'S FIRST CIRCULAR PELLETIZING PLANT

### Customer.

Pro Minerals Pvt. Ltd., India

### Type of plant.

Circular Pelletizing Plant (191 m<sup>2</sup>),  
Output 1.0 mtpy

### Our solution.

A circular pelletizing plant including level 2 expert system, preprocess facilities such as additive grinding, mixing, and green pelletizing, implementation of dual fuel system: heavy oil + coal gasification



**Primetals Technologies Austria GmbH**

A joint venture of Mitsubishi Heavy Industries and partners

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Brochure No.: T01-O-N011-L4-P-V2-EN

Printed in Austria

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