PRIMETALS
TECHNOLOGIES

GAS CLEANING PLANT (GCP)
PROVIDING A RELIABLE, GREEN AND COST EFFECTIVE SOLUTION

GREENER GAS CLEANING TECHNOLOGY
SAFE AND SUSTAINABLE WASTE REDUCTION

SUSTAINABLY MINIMIZING WASTE

The primary aim of Primetals Technologies Gas Cleaning Plant (GCP) solutions is to enable steelmakers to minimize waste in a safe and sustainable manner.

This is achieved through an in-depth process knowledge of gas cleaning plants themselves and all the processes associated in and around the blast furnace.

This process knowledge combined with experience of modern technologies means we can offer a system that surpasses the requirements of modern environmental standards.

Our innovative portfolio provides the key to long-lasting and profitable furnace operations. Key technologies which can also be retrofitted into existing vessels include:

- Gravity dustcatcher
- Patented single and triple tangential inlet cyclones with an optimized bypass system
- Single and triple Davy Cone Scrubbers
- Options for both internal and external demisters with all scrubber variants

ENGINEERING EXCELLENCE

Primetals Technologies experience continues throughout all stages of a contract and can provide solutions from simple front-end design to full turnkey solutions.

Design – Expertise in design of gas cleaning equipment and recognizing best available techniques.

Construction – Trained to meet highest site safety standards with a depth of experience across all regions of the globe.

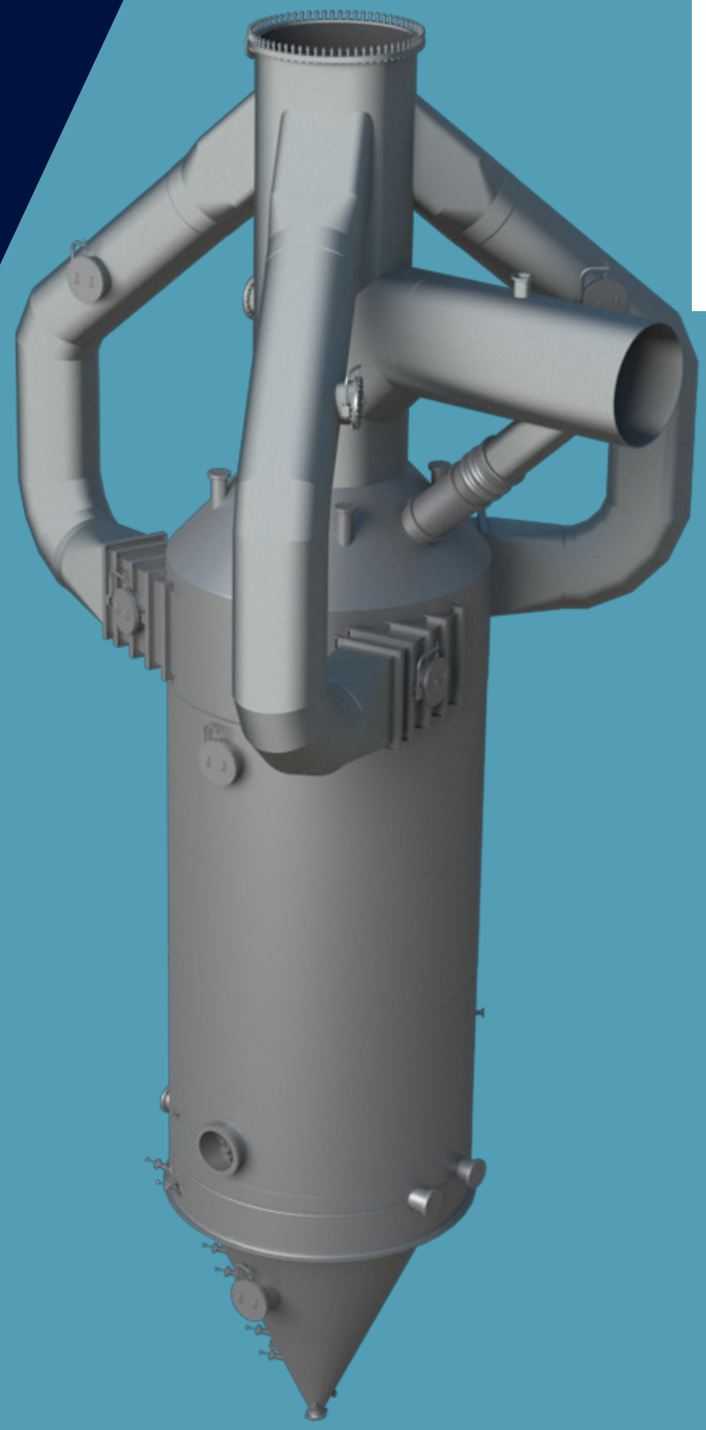
Commissioning and operation – In depth knowledge on the fundamentals of a GCP from both the aspect of designer and operator. Allows a streamlined approach to full production.

PROCESS OPTIMIZATION STUDIES

Primetals Technologies can offer a variety of comprehensive gas plant studies and health check investigations to ultimately enhance process plant performance, leading to better operations, lower fuel costs and better productivity from your blast furnace.

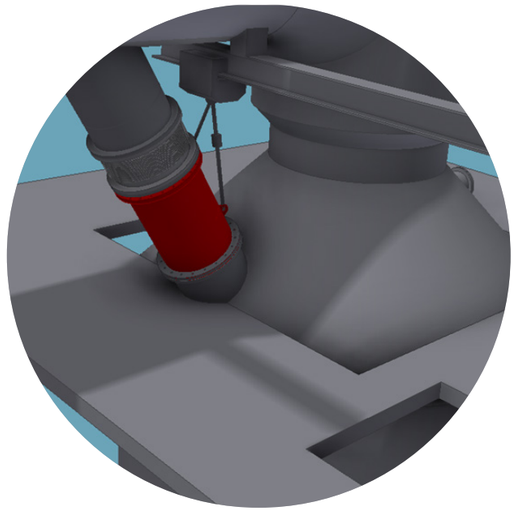
Expert analysis techniques allow the condition of your plant and equipment to be determined and therefore the limits of operation for your process.

> “Every plant owner would like long term operation, lower dust emission and high reliability for their blast furnace. The excellent engineering of the GCP by Primetals Technologies makes this dream come true”
>
> **Mr Tsai, General Foreman of Operation Technical Staff Unit, Ironmaking Department, China Steel Corporation Group, Dragon Steel, Taichung**



TRI-AX CYCLONE

- Three inlet arms providing axial symmetry at the inlet region
- Maintenance free - no wearing internal parts
- Tunable bypass arrangement
- Increased ferrous recovery
- Increased carbon recovery
- Reduced water used at the scrubber plant
- Reduced waste to landfill



Adjusting the efficiency of the cyclone has never been easier and provides the operator the flexibility of recovering dust to suit their needs.

DRY GAS CLEANING
TUNABLE AND RELIABLE TRI-AX CYCLONE TECHNOLOGY

WEAR RESISTANT EFFICIENT TECHNOLOGY

Primetals Technologies patented Tri-Ax Cyclone provides safe and reliable dust collection.

The dry dust collection stage downstream of the blast furnace has traditionally been carried out by a gravity dustcatcher.

In recent years environmental considerations have led to the increased use of cyclone type dustcatchers. Cyclones have the advantage of operating at a higher efficiency, in the region of 85% or higher. This significantly reduces the sludge generation at the water treatment plant, preventing excessive waste going to landfill.

EFFICIENCY TUNING - BYPASS SOLUTION

The bypass arm is a simple concept that allows operators to tune the efficiency of the cyclone separator to meet site specific demands.

It is a spool pipe with an adjustable internal wear resistant lining that is used to regulate the dust capturing capability of the cyclone.

MAIN BENEFITS

- Simple downcomer support
- Positive isolation of gas cleaning plant from blast furnace
- Ability to adjust the efficiency by the use of patented bypass technology
- Optimum dry dust collection
- No moving parts
- No potential for blockage/swirl deterioration
- Safe dust removal system
- Long life solution - Wear resistant lining purposely designed to minimize wear zones
- Maintenance friendly – System has a handling facility designed in to allow adjustments to be made during regular shutdowns

“The stability of the GCP and the performance of de-dusting in Blast Furnace Gas (BFG) are both good. It has been used for 12 years and it still can retain high efficiency and be in keeping with all official environmental agreements.”

Mr Tsai, General Foreman of Operation Technical Staff Unit, Ironmaking Department, China Steel Corporation Group, Dragon Steel, Taichung

WET GAS CLEANING
TRIED AND TESTED DAVY CONE SCRUBBER

LOW MAINTENANCE AND LONG-LIFE TECHNOLOGY

The final stage of the gas cleaning plant is the cleaning of the fine dust and removal of free water.

As the gas enters the scrubbing vessel it is hit with water. This saturates and cools the gas removing the bulk of the dust. The final dust removal is then carried out by the Davy Cone, reducing the dust content down to the desired level.

Finally, the gas passes through a demisting device where the remaining free moisture is removed, and a clean fuel gas can be utilized downstream.

THE DAVY CONE

The Davy Cone was developed in the late 1980’s and early 1990’s. Since then, the geometry of the cone has evolved along with the construction materials allowing the design to overcome the modern-day challenges that it faces e.g. the increase in coal injection and associated chloride attack of the gas cleaning plant.

MAIN BENEFITS

- Accurate top pressure control
- Outlet dust concentration < 5 mg/Nm^3
- Free moisture in gas stream < 5 g/Nm^3
- Davy Cone Scrubber – Durable with long life
- Material selection can be chosen to function in extremely corrosive conditions
- Effective and safe water discharge system. No risk of gas escape
- Can be tailored with the Primetals Technologies hot blast stove and TRT to provide maximum energy payback
- Proven design that requires minimum maintenance
- Multiple cones can be used to offer redundancy

TATA STEEL, PORT TALBOT, BF 4
ENHANCED DUST RECOVERY

REBUILD OF BLAST FURNACE 4

During the rebuild of blast furnace 4 a new gas cleaning plant was supplied within the existing footprint.

It replaced an existing dustcatcher system with Primetals Technologies unique Tri-Ax Cyclone, single Davy Cone Scrubber and internal packed bed demisting unit.

The plant has now been in operation since 2013.

MAIN BENEFITS

- Increased ferrous and carbon fines recovery at the cyclone which are then recycled to the sinter plant.
- Reduced sludge loading at the water treatment plant.
- Minimized downtime of plant and downstream equipment.

Tri-Ax Cyclone and modified downcomer

CSC GROUP, DRAGON STEEL, BF 1 AND BF 2
ECO FRIENDLY FOR OVER 12 YEARS

NEW BLAST FURNACE COMPLEX

Commissioned in 2010 and 2012 respectively, the Dragon Steel gas cleaning plants utilize recognized and proven technologies, including a dustcatcher, Davy Cone Scrubber and external demister.

Both plants have performed admirably since commissioning without major issue over their campaigns.

MAIN BENEFITS

- Proven design utilized.
- Maintenance friendly solution.
- Limited moving parts.
- Multiple cones provided to offer redundancy.
- Perfect synergy with downstream equipment as Top Gas Recovery (TRT) supplied as part of the contract.

Gas cleaning plant at Dragon Steel BF 1

RINL, VISAKHAPATNAM STEEL, BF 1 AND BF 2
INCREASED CAPACITY OF GAS CLEANING

MODERNISATION OF BLAST FURNACES

The blast furnaces at Visakhapatnam site were revamped increasing the overall production of each furnace.

Retention and upgrade of the existing gas cleaning facilities combined with the addition of a new Davy Cone Scrubber and dustcatcher dust discharge system were provided on the new gas cleaning plant.

The new facility allowed for a higher throughput while cleaning the gas to the desired level.

MAIN BENEFITS

- Davy Cone Scrubber built alongside operational plant to reduce the overall shutdown time.
- Improved safety with modern water level control system.
- Reduced dust and moisture carryover to downstream processes.

New Davy Cone Scrubber installed inline with existing spray tower

ARCELOR MITTAL, DĄBROWA GÓRNICZA BF 2
FUTURE ENERGY EFFICIENT OPERATION

STATE OF THE ART GAS CLEANING

ArcelorMittal Dąbrowa Górnicza offers a fully turnkey solution that will be commissioned in 2023.

It will be fitted with the latest Tri-Ax Cyclone and optimized Davy Cone Scrubber solution that will operate with the lowest running costs to date.

MAIN BENEFITS

- Tunable bypass arrangement.
- Dust free emissions and novel dust discharge system.
- Reduced spray requirement and reduced loading on existing water treatment plant.
- Increased energy recovery at the TRT by utilizing alternative waste streams.

3D model of the future ArcelorMittal Dąbrowa Górnicza plant

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