CUPOLA

Melting Plant Technology

Continuous Melting
Low Emissions
High Flexibility

KÜTTNER
GOOD REASONS TO CHOOSE CUPOLA MELTING

Low Cost
• Melting
• Carburization
• Metallic charge
• Operational staff
• Maintenance
• Hot metal

Low Emissions
• Dust and heavy metals
• Carbon dioxide
• Others

High Flexibility
• Melting scrap contaminated by
  - plastics or grease
  - dirt or slag
• Melting of large amounts of galvanized scrap
• Melt rate variable up to +/- 35 %
• Production of different iron grades

Applications
• Grey iron
• Ductile iron
• Compacted graphite iron
• Malleable iron
Storage and Batching

A smooth melting process with little fluctuations in the iron chemistry requires an accurate batching system. State-of-the-art weighing technology and automatic corrections based on the actual weights being charged ensure superior process control. Nonmetallics are stored in bins and charged by feeders. Metallics are either dosed into weighing hoppers by a magnet or a hopper / feeder arrangement.

Charging

The charge bucket collects the charge while travelling on the transfer car. The bucket is hoisted to the charging platform and positioned above the cupola center. The charge material drops evenly into the charge receiving section of the cupola head through the slowly opening bottom doors.
CUPOLA FURNACE
IRON AND SLAG HANDLING

Cupola Furnace

Center charging ensures good distribution of the charge. The gas charge below take off keeps the furnace head smoke-free. The water-cooled cupola shell, together with the water-cooled protruding copper tuyeres, makes a long hot blast campaign possible.

The cupola features either a bare shell or a refractory lined cupola shaft. Depending on operational requirements the slag is separated from the iron in the well or in the external pressure siphon.

Hot Blast Generation

Hot blast is beneficial to the cupola operation as it saves coke and silicon, achieves higher iron temperatures and carbon pick-up. The cold blast is heated by the flue gas from the top gas combustion. The heat exchanger bundles are placed in refractory lined boxes for easy removal. The ductwork and the wind ring are insulated to minimize heat loss.

Iron and Slag Handling

Slag is a valuable by-product. Dry granulation combines simple operation with easy installation. Wet granulation produces a well-defined granulated product. Iron storage in holding furnaces ensures excellent temperature and chemistry control while achieving higher availability.

Desulphurization with CaO or CaC₂ decreases Mg consumption during ductile iron treatment and enables the melting of CGI base iron.

Atmospheric siphon
Slag floating on top being separated from the iron
Dry slag granulation is an environmentally friendly solution.
Emission Control

The top gas is burnt, cooled and filtered. This method combines low particulate emissions with simple operation and low electric power consumption.

Wet gas cleaning systems generate a clean fuel gas, which can be exported. A spray cooler upstream the disintegrator ensures gas cooling and a droplet catcher downstream removes the water. The combustion products have low sulphur and NOx emissions thus being beneficial to the recuperator lifetime.

Environmental authorities from the US, Japan, Brasil and the EU have confirmed recently that all emissions are well below the permitted limits.

Heat Recovery

Excess energy of the top gas combustion is utilized through hot water, steam or thermal oil systems.

Automation Technology

KÜTTNER supplies innovative process automation and control systems. With the Industrial Information Management System (iIM) the gap has been closed between production and the office world, enabling the provision and use of more reliable and sophisticated operational data.
The engineering company, which was founded in 1949 by Dr. Carl Küttner, has evolved into a group of companies working worldwide in plant engineering and construction. The company supplies and erects turnkey installations for a wide range of process technologies, including melting and material handling in the iron, steel and foundry industries. Küttner is the leading supplier for Cupola technology worldwide. GHW, Germany, Sopame, France and former Küttner-Modern LLC, USA are part of the Küttner group contributing with their specific know-how and experience.

The services provided include development of new technologies, engineering and design, supply, installation and start-up of plants complete with controls and data processing systems.

The Küttner-Group works with more than 400 employees worldwide and is represented in the international markets through a network of agents and affiliated companies.