



BOLDOROCCHI

ESTABLISHED IN 1909

IRON & STEEL PLANTS APPLICATIONS

WORLDWIDE ENGINEERING & PRODUCTION EXCELLENCE

Boldrocchi Applications in Iron & Steel Plants

Boldrocchi Group, headquartered in Italy, since 1909 designs and manufactures custom-engineered equipment to successfully start up the complete gas handling and dedusting system of any steel plant. The Group has subsidiaries in India, Egypt, Europe, USA, Mexico and Brasil and can provide an excellent site services and a worldwide assistance. Boldrocchi is certified as conformed with ISO 9001.

HEAVY DUTY FANS

Some of today's most arduous and stressing applications for centrifugal fans and blowers are to be found in the iron and steel industry. **With more than one century of experience, Boldrocchi has been supplying fans to the world's major contractors & end users.** Many of the features which make the fans uniquely suitable for the steel industry are the result of this long experience, continuous investment in R&D and innovation. We offer a variety of blade types to provide optimum efficiency, abrasion, and build-up resistance. With each blade type having different wear characteristics and efficiencies, we will recommend the most appropriate solution design for any application.



Boldrocchi provides fans for all the major steel making applications that include:

- Fans for sintering plants, such as the sinter exhauster (sometime referred as waste gas fan) and the dedusting fan
- Fans pelletizing plants, such as windbox recuperation, updraft drying, windbox exhaust, hood exhaust and cooling air, including fan for indurations furnaces
- Main exhaust fan (ID fans) and booster fans for electric arc furnaces
- Gas extraction fans installed after electrostatic precipitators or bagfilters
- Fans for basic oxygen and direct reduction steelmaking
- Cooling fans
- Combustion air fans

HIGHLY EFFICIENT DESIGN

Our fans are highly efficient designed to guarantee the supply of equipment of **great reliability with the consequent reduction of maintenance costs.** Our rotors are designed using the Finite Element Analysis, in order to check stresses on each part of the impeller and mainly to avoid possible ruptures due to fatigue caused resonances, continuous speed variations or repeated start and stop cycles.

In order to solve the problems connected to erosion a special consideration is given to the design and selection of **anti-wear blades**, using the proper type of materials, from hard steel to the different types of chromium carbide and even **tungsten carbide** for some applications. On heavy duty applications, the scalloped center plates to minimize erosion, weight, and inertia. Rotors are selected at proper speed in order to minimize the effect of unbalance on vibrations. **Forged steel shafts with integral hub** are designed with higher critical speed coefficients and we always perform **torsional analysis to avoid resonances** within the operating speed range. **Impeller ID & OD is machined** to limit axial and radial play, ensuring closer manufacturing tolerances resulting in higher efficiency (lower power consumption), lower vibrations at the bearing (longer life of rotating parts).

PROCESS DAMPERS

Custom-designed dampers for many applications are built according to critical operational requirements, depending on pressure, temperature and airflow regulation. Additionally, we possess our technical knowledge to manufacture dampers in highly corrosive, abrasive and elevated temperature environments, as most of the ones present in the iron and steel making.

AIR POLLUTION CONTROL

The portfolio of solutions that Boldrocchi Group is able to offer starts from the **simple delivery of individual machines, up to** the realization of complex **turnkey plants.** Knowledge of the process for each stage of production of steel is definitely the starting point in the preparation of the optimal solution: all the process equipment are **tailor made designed** in order to achieve the best performances.

To consolidate the strength in this market, in May 2014 Boldrocchi has acquired the company **Hascon Engineering.**



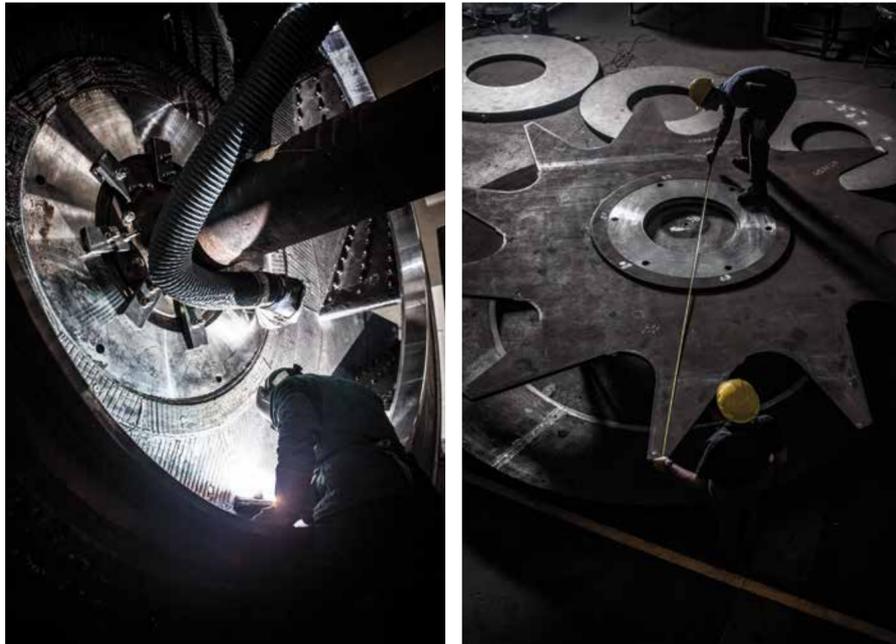
- **Process Pulse Jet Bag Filters** - The Boldrocchi bag filters are based on the pulse jet technology, with "on-line" cleaning system, and have been developed with different types of design in iron and steel making with different bag lengths, up-to-date bag materials to fit various process needs such as high temperature, high dust load, to face the presence of acid gases and to minimize the pressure losses.
- **Electrostatic Precipitators** - Proprietary design and in-house manufacturing of the rigid electrodes, that are individually suspended at their top with the opposite end free for thermal expansion.
- **Hybrid Filters** - In the hybrid filters, most of the dust is collected in the first part by the ESP, while the second part reduce emissions to respect the most stringent norms.
- **Conversion of Electrostatic Precipitators in Pulse Jet Bag Filters** - When there is the need to reduce the dust emission in existing plants, the cheapest solution is generally the conversion of the ESP in a Bag Filter. The fluid-dynamic analysis of gas behavior and the design flexibility are utmost important.
- **Atex Pulse Jet Bag Filters** - Whenever there is presence of explosive dust, we are a specialist service provider, ensuring compliance to the regulations from a "Total Care" package to individual or tailored requirements.
- **General Dedusting** - Around the plant the Boldrocchi nuisance bag filters are installed to guarantee an environmentally friendly operation.
- **Gas Conditioning Towers** - GCT are proposed with dual fluid spaying system (water and compressed air) or with spillback spraying system (water at high pressure). Both solutions are with unique design in the distribution plates at the inlet to optimize the gas cooling and water evaporation.
- **Gas Reactors** - By means of the most suitable reagent added in the conditioning tower we can reduce the content of many gaseous pollutants and neutralize a low pH.
- **Air-Air Heat Exchangers** - The Boldrocchi air-air heat exchangers are designed to last for long time, without any need of maintenance. The lowest pressure drop and power consumption is always a key feature of this equipment.

BOLDROCCHI SERVICE

Plant production can frequently be increased by modifying only few components, while others have been originally supplied with enough margin. **The possibility of increasing the fan capacity and pressure, while minimizing the modifications to layout and ductwork,** is an important parameter that may help to make the decision to proceed with the modification of the plant. **EM&S is our service division dedicated to the upgrade of existing installations,** having the possibility to grant all the needed services, starting from the feasibility study up to the supply, installation and commissioning of the new components, including field balancing.

SINTER AND PELLET PRODUCTION PLANT

Equipment for sintering and pelletizing operate in most difficult and stressing conditions. Boldrocchi portfolio for these applications covers **Air Pollution Control Equipment/Plant, Main Process Fan, Heavy duty Dampers and Inlet & Outlet Silencers.**



Steel Making

Boldrocchi has a long experience in the EAF route steelmaking Fume Extraction System, with own technology a know-how, thanks to that is able to design and realize pollution control and heat exchange systems besides the noise control, for EAF, LF, MHS, BOF, AOD, Slag Treatment and general dedusting applications.

The large volume of raw gas, the content of CO, volatiles and dioxin increase the difficulty in steelmaking.

Boldrocchi has proper gas treatment plant design and long list of applicable products, such as:

- Quenching Towers
- Forced Draught or Natural Coolers
- Electrostatic Precipitators
- Bag Filters
- Booster and Exhaust Fans



SILENCER



FORCED DRAFT COOLER



QUENCHING TOWER

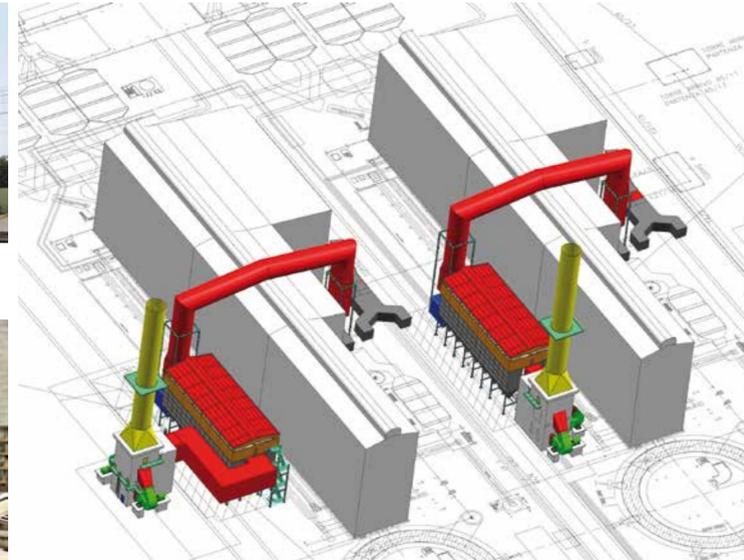
Worldwide Products • Onsite Service • Tailor Made Solutions



WATER COOLED DUCT



EAF EXHAUSTER



NATURAL COOLER



PROCESS DAMPER



BAG FILTER



EXHAUST FANS GROUP



BOOSTER FAN



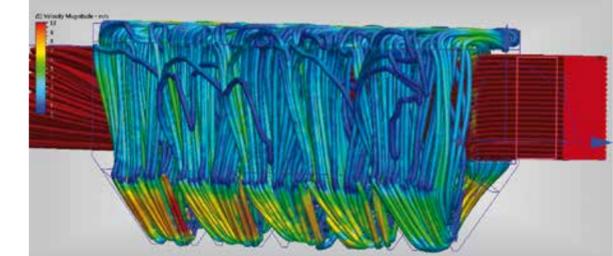
ID FAN

IRON MAKING

Boldrocchi range of supply includes the dedusting systems for the cast and stock house, raw material and coal handling, secondary applications as oxy-cutting department and PCA department. For these applications we have supplied various plants, including:

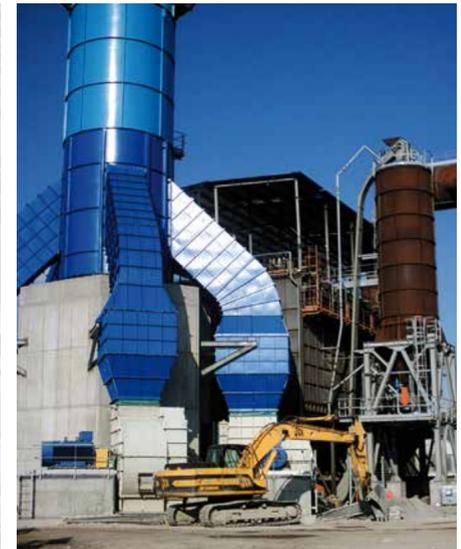
- Bag Filters
- Cyclones / Spark Arrestors
- Hoods
- Fans
- Stacks

as sole equipment supply or as plant on a turnkey basis, installed all over the world.



METAL MAKING

This is one of the historical markets for the Company: the non ferrous metals refining and production always requires depth knowledge of the process and of the related technology for gas cleaning and ventilation. Our plants cover the complete post combustion, gas cooling and acid gas control systems for secondary refining of Cu or Al, as well as the large particulate control systems for brass foundry emissions and all Fe-alloys induction and SAF furnaces for ingot production, as well as Pb, Zn and heavy metals recovery plant.





BOLDROCCHI

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