

BOLDROCCHI
ECOLOGIA DIVISION

HISTORICAL NOTES



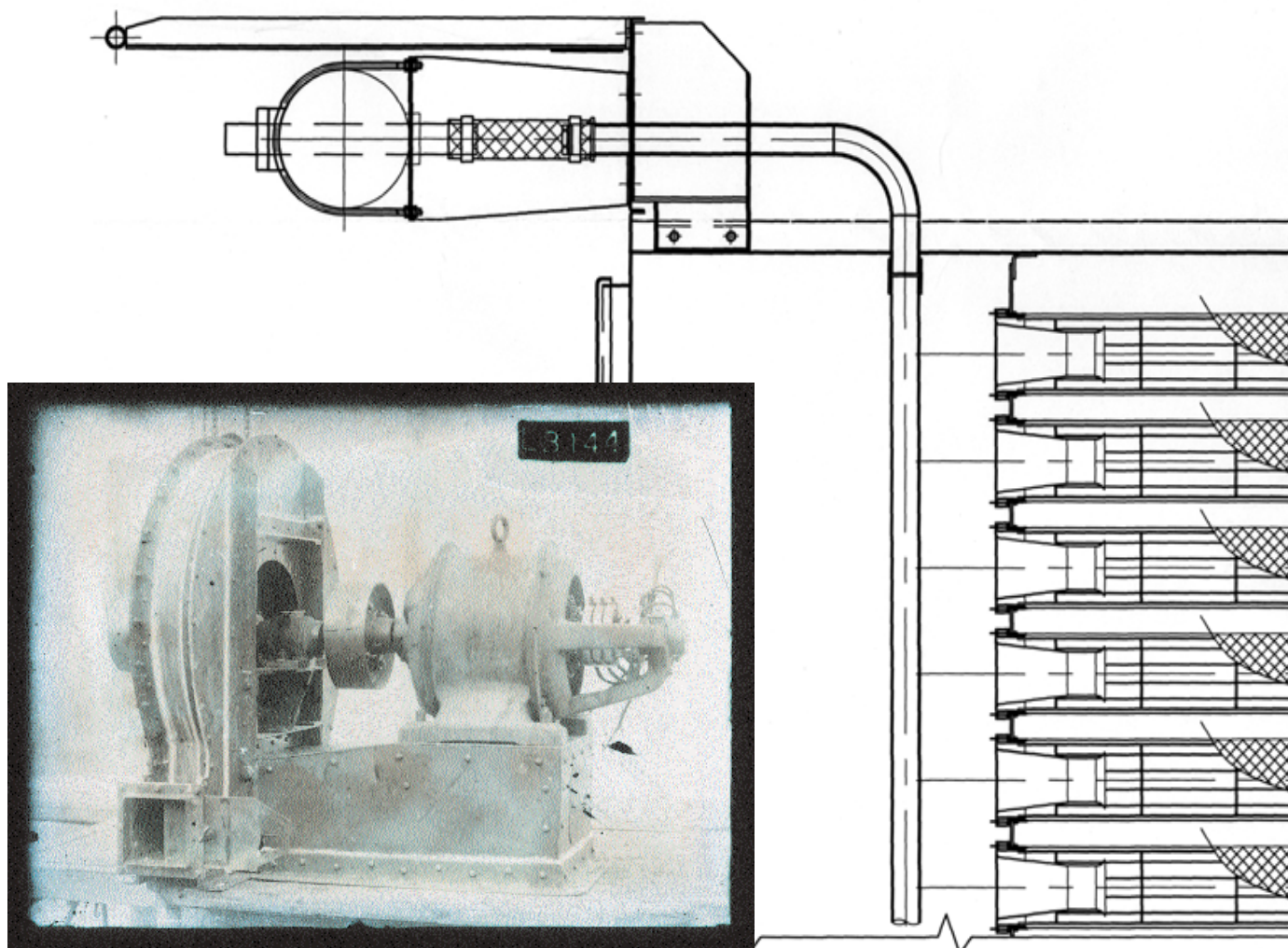
Ing. Luigi Boldrocchi (1880-1949)
Founder of the Boldrocchi Company

- On the 3rd of March 1909 LUIGI BOLDROCCHI established the activity with the first orders for the supply of ten centrifugal fans.
- In 1911 the Officine Termo Meccaniche BOLDROCCHI was set up in Milan with an operating area of 3000 square meters.
- In 1914 the first plant for air pollution control was produced.

Known above all for air moving machines and systems, after 1945, Boldrocchi was able to satisfy the need for air purification systems arising from the reconstruction of industrial activities in Europe. In order to take on more complex environmental applications, Boldrocchi in 1970 became a licensee of the Swedish company Bahco, known for its high efficiency air pollution control technology, mostly employed in steel, cement and boiler applications.

From its inception, Boldrocchi Ecologia has provided a strong impetus to the research and development of air purification technologies and processes, extending the applications to

important new industrial sectors and completing the spectrum of available technology.



D.I. high head centrifugal fan
supplied in 1915

COMBUSTION SOURCES



1



2



3

1

***Incineration gas
reactor and fabric filter***

2

***Flay ash electrostatic
precipitator on wood
waste boiler***

3

***Gas treatement
and dust filtration
on chemical waste
incineration***

PRODUCTS

Air pollution control equipment, together with the other principal components integral to such systems, constitute the range of specialized products that Boldrocchi Ecologia designs and continually updates, testing innovative solutions in our own testing facilities.



Fabric Filters

Our experience with specialized filtration fabrics allows us to successfully treat gases at high gas temperatures ($>250^{\circ}\text{C}$), gases containing aggressive chemicals, such as oxides of sulfur and chloride, ultra-fine dust ($<1\mu\text{m}$), and high dust concentrations ($>1000\text{ g/Nm}^3$).

To every operating condition corresponds a custom-designed and specialized project, optimized by a competent technical department, eminently capable of selecting the right materials, engineering the process control system and properly dimensioning systems for applications greater than 2 million m^3/h .

Wet Scrubbers

Particulate scrubbers are available in both high and low pressure drop designs, and are applied based on the required collection efficiency and on the specific particle characteristics.

Special gas scrubbers are employed for acid gas removal applications by way of neutralization stages, placed in series. A Boldrocchi Ecologia specialist will evaluate each individual chemical process requirements and, based on a specific neutralizing chemical selection, calculate the gas outlet conditions, integrating the results into a state-of-the-art gas cleaning system, complete with chemical utilization and neutralization efficiency guarantees.



Electrostatic Precipitators

Because the collecting elements are constructed from steel, they are capable of separating particulate from gas stream over 400°C , ensuring a stable and reliable service for many years, with modest maintenance requirements.

Excellent capture efficiency on small particles and a low energy consumption confer advantages on this technology that has made it the choice in pulverized coal firing power boiler applications.

METALS



1

All foundry and metals refining processes have provided Boldrocchi Ecologia with the opportunity to show our ability to design gas cleaning plants based various different control technologies.

From complete post combustion, gas cooling and acid gas control systems applied to secondary refining of copper or aluminium, to the large particulate control systems for the control of brass foundry emissions; from sophisticated applications on zinc and lead lines, to fabric filters on precious metals processes, Boldrocchi Ecologia has experiences.

All of these applications, together with many others from experiences various other metals processes, have been the testing ground upon which Boldrocchi Ecologia has shown the range of its competence in the sizing and implementation of emissions control systems.



2

3



1

**Brass foundry
primary and secondary
dust control
and bag filter**

2

**Aluminium smelting
gas cooling
and fabric filter**

3

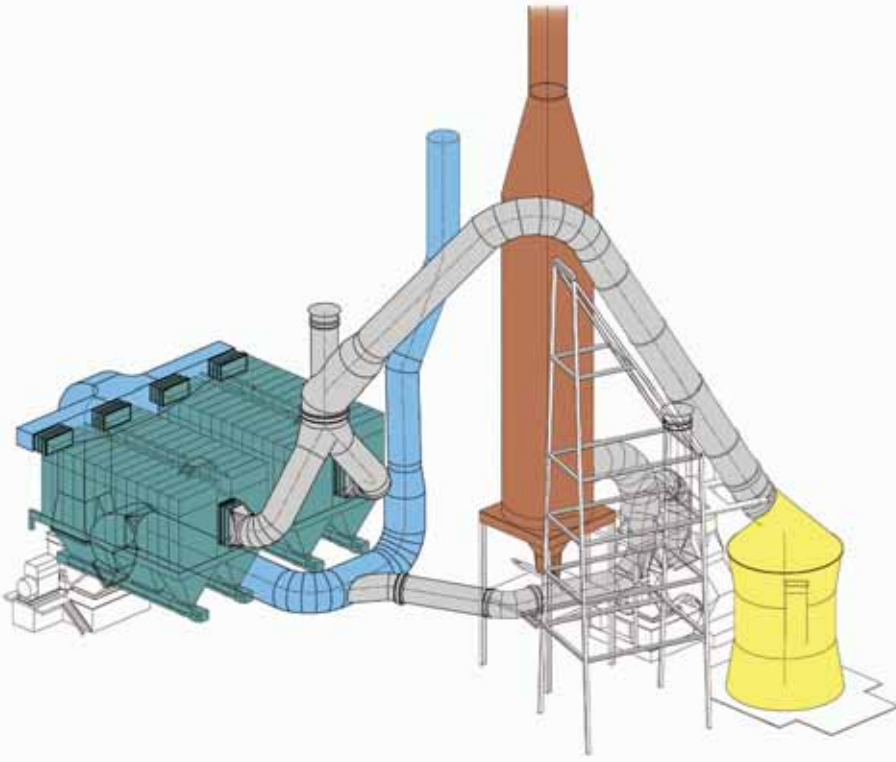
**Dedusting plant
for copper refining
furnaces and continous
casting**

CEMENT

The production of cement requires large air volumes that become polluted during the calcining and grinding of raw materials as well as the cooling and grinding of clinker. In the control of particulate emissions from these processes, fabric filters continue to gain popularity over electrostatic precipitators due to their ability to control particulate in a more consistent fashion.

Recently, it has become popular to incorporate all of the various emissions points into one single particulate collection system, complemented by an evaporative gas conditioning tower for temperature reduction and a powerful induced draft fan.

Boldrocchi Ecologia is capable of supplying and installing particulate control systems, assembled from components entirely designed and engineered according to our own technology, respected for its efficiency, reliability and value.



1

2



1

**Cement kiln
Row mill
Bag filter**

2

**Clinker cooler
Vent gases heat
exchanger
and fabric filter**

STEEL

1



2



1

DC/EF dust control system from primary suction elbow and canopy hood
gas volume
1.100.000 cm/h

2

Steel furnace forced air gas cooler

3

Water cooled gas intake and combustion chamber

3



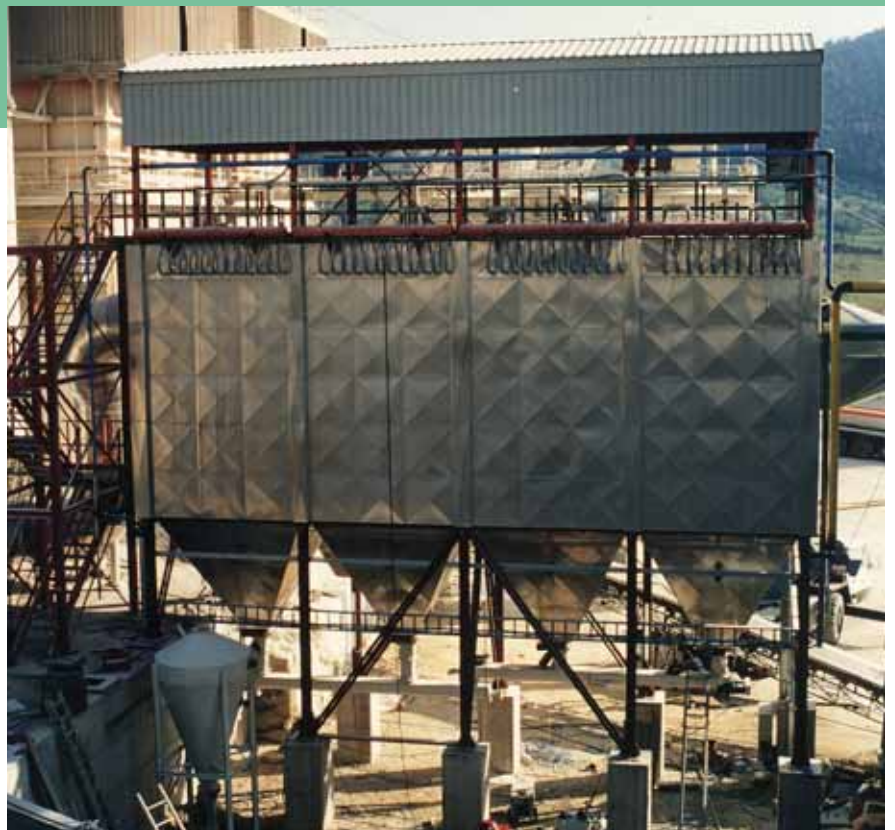
LIME



Operating for many years under the oscillating gas temperature conditions characteristic of vertical shaft lime kilns, Boldrocchi Ecologia fabric filters have proven themselves capable of providing a high particulate control efficiency at low pressure drops. In addition to process equipment, fugitive dust from stationary sources emitted by the various materials transport systems employed in the production of Lime, are controlled by Boldrocchi Ecologia filters, whose technology has been applied successfully to difficult gases, including those with high humidity content, such as lime hydrator exhausts.

1

2



1

Bag filter with thermal insulation for gas dedusting on a large lime furnace

2

Four compartment pulse jet fabric filter

STEEL

Steel production, whether produced in an integrated plant with blast furnace and BOF, or in a mini-mill with an electric arc furnace, generates large gas volumes at elevated temperatures. Maybe more importantly, these gases contain large amounts of fine dust, and, in the case of the electric arc furnace, are compounded by volatiles that can be potentially difficult to handle upon condensation if not managed properly.

The dimensions of the problem dictate one of a number of solutions –large containment devices located high above the emission point, ducting systems with intakes close to the combustion point, operating at above 1500°C, or suction hoods subjected to shards of molten metal and enclosures capable of attenuating acoustic emissions above 130 dB.

Downstream, after the indirect or evaporative gas cooling system, a large fabric filter capable of purifying volumes in the millions of cubic meters, and powerful, variable speed fans ensure the extraction of purified gases and propel them to the atmosphere.

Boldrocchi Ecologia possesses the experience needed to solve all difficulties in controlling air quality, allowing us to provide the steel industry with effective custom engineered solutions, precision manufactured components and expert installations.



1

2



Dedusting system for torpedo car deslagging pit

1

E.A.F. integrated dedusting system

2



3



4

5



Electrostatic precipitator to bag filter conversion

3

Head exchanger and bag filter on clinker grate cooler

4

Cement kiln exhaust fan during workshop running test

5

STEEL

5



4



6

*Torpedo car
deslagging tunnel
and suction hood*

4

*Steel ladle furnace
six compartments
bag filter*

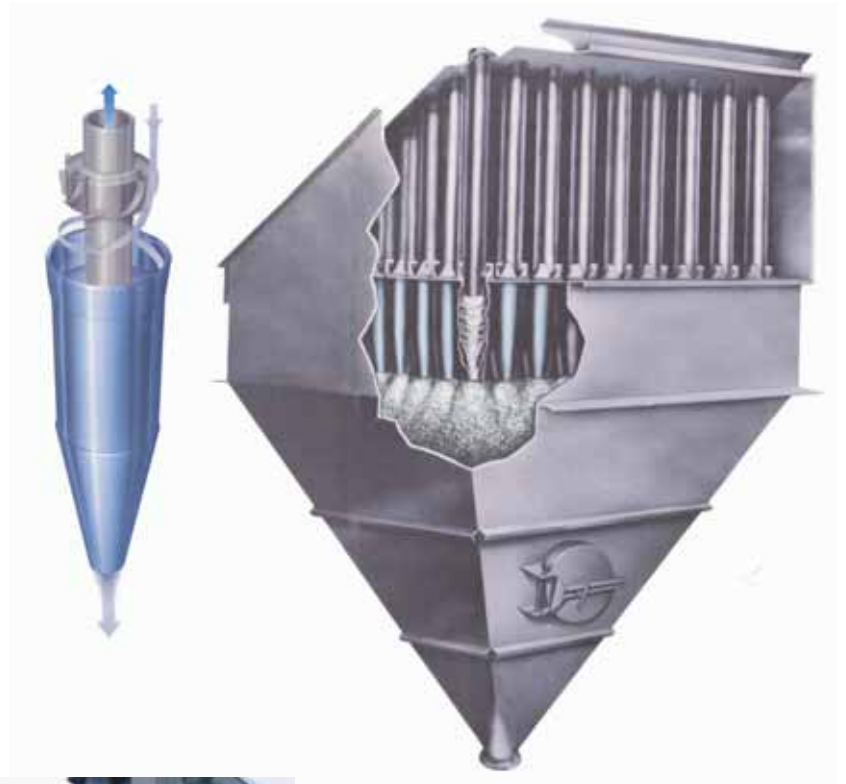
5

*Fabric filter
and fans for steel
furnace dedusting*

6

Cyclonic Separators

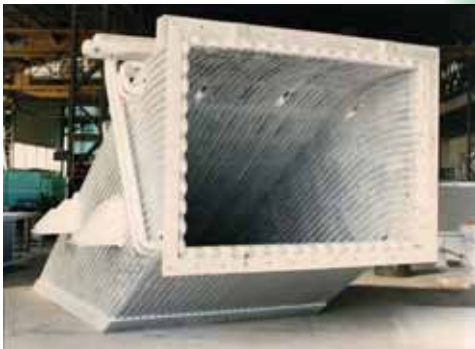
With applications above 450°C, they take advantage of the centrifugal action of the gases to separate suspended particulate, finally collecting them in the hopper, providing a single evacuation point. This centrifugal action is especially effective on particles of a certain size and density, making them particularly suited for erosion control upstream of fans and finish filtration.



Boldrocchi Ecologia engineers and manufactures even all the ancillary specialized equipment necessary to complete gas cleaning and moving systems:

- Forced air-to-gas heat exchangers
- Air and pressure atomized evaporative gas coolers
- Air fin coolers
- Pipe-to-pipe water cooled ductwork
- Control dampers
- Materials handling and transport systems

All systems are naturally equipped with Boldrocchi fans, amply described in available brochures.



COMBUSTION SOURCES



From fossil fuels to waste-to-energy, the experience of Boldrocchi Ecologia in combustion processes allows us to employ fabric filters, electrostatic precipitators and cyclones, often part of a system that includes gas cooling, as well as control of acid gases, metals, dioxin/furans and organic compounds.

Our vast array of technologies ensures the possibility of obtaining a complete exhaust gas treatment line, from the exit of the boiler or furnace, to the stack, with strict adherence to every international emission standard.

1

*Three fields
electrostatic
precipitator
on waste
to energy plant.*

1

*Incineration gas
dry scrubbing
and dedusting with
pulse jet bag filter*

2



2

DIVISION PROFILE



Station de CAO au bureau d'études

BOLDROCCHI ECOLOGIA is actually a separate division, specialized in the design e supply of turn-key air pollution control systems for industry.

The Ecologia division employs over 30 engineers and specialized technicians, all capable of designing complete gas cleaning lines for various process exhausts.

The manufacture of the specialized components is carried out in two different manufacturing facilities that employ a total of 120 workers. These factories include separate facilities dedicated to the thermal, acoustic, and airflow testing of manufactured products.

Boldrocchi has operated since 1993 under the ISO 9001 quality control system.

Over and above our domestic production capacity, Boldrocchi has project execution capabilities available in France, Germany, India and in the United States. Furthermore, we have established collaborations with fabrication and erection companies in many countries around the world in order to be able to carry out qualified and competitive turn-key solutions.



Fans Test Facility in Arcore Workshop

RESEARCH AND DEVELOPMENT



1

The pressing need to achieve higher removal efficiencies together with ever decreasing energy requirements, simplicity in construction, and maximum reliability, has continually driven Boldrocchi Ecologia to develop products through two complementary means:

- Experimentation in our laboratories and test facilities, leading to the development of innovative solutions
- Field testing of pilot and demonstration systems in order to verify and optimize developments and advances in technology within an industrial environment

In these ways we are able to render more effective and competitive all technological advances, as well as ensure that they provide concrete and reliable benefits for years to come.



3



2

*Bag pulsing
test facility*

1

*Testing a new filter
control system*

2

*Special bags
inspection*

3



BOLDROCCHI FACTORY IN BIASSONO



BOLDROCCHI FACTORY IN ARCORE

MAIN CUSTOMERS:

CEMENT AND LIME

Buzzi Unicem - Cimprogetti - Colacem - FCB - Fornaci Calce Grigolin - Halyps - Holcim - Italcementi
Lafarge - Polysius - Unicalce - Vicat - Villaga Calce - Vulcan

STEEL AND METALS:

Alfa Acciai - Almag - Arcelor - ASO - Cogne - Europa Metalli - Ilva
Lucchini - Riva Acciaio - SMS Demag - Valbruna

POWER AND INCINERATION:

Ansaldo - CEB - Edison - Foster Wheeler - Snamprogetti
Termomeccanica - Veba Oel - Von Roll

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