BOLDROCCHI

ESTABLISHED IN 1909

Air Pollution Control Division

Air Pollution Control Division

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

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

Air Pollution Control Division

Ever since the foundation, BOLDROCCHI ECOLOGIA has contributed with avant-garde technologies to the control of gaseous emissions from industrial plants, realizing treatment systems for atmospheric pollutants.

From the results obtained by hundreds of systems, BOLDROCCHI ECOLOGIA can find reliable solutions for all types of polluting emissions: from the traditional dust removal to the most highly sophisticated technologies for reducing organic micro pollutants, gaseous acids, vaporized metals, sulphur and nitrogen oxides and all other air pollutants.

Air Pollution Control Division

BOLDROCCHI ECOLOGIA has all the experience required to design and construct complete smoke extraction and dust removal systems on each part of the production process and, as a result, is capable of purifying an entire industrial works.

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

Air Pollution Control Division

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

Air Pollution Control Division

FABRIC FILTERS
High efficiency Pulse Jet bag filters for all types of applications, with low and high temperature, high inlet dust content with capacity up to 2,500,000 m^3/h

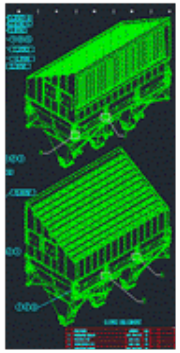
ELECTROSTATIC PRECIPITATORS
Dry ESP with Rigid Electrodes

MECHANICAL COLLECTORS
Cyclones and multi-cyclones

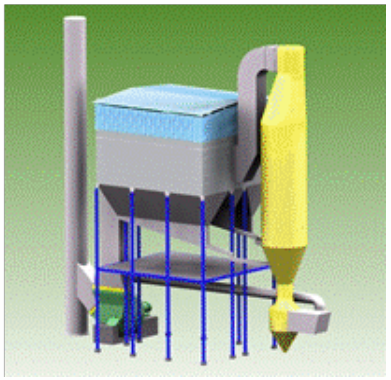
GAS COOLERS
Air-air heat exchangers (FDC-NC)
Gas Conditioning Towers

GAS REACTORS
Dry and semidry basic reactors
Activated carbon dry reactors
SO_x and NO_x removal systems





PULSE JET BAG FILTERS

Bag Filters – Tailor Made Design

The Boldrocchi bag filters are based on the pulse jet technology, with “on-line” cleaning system.

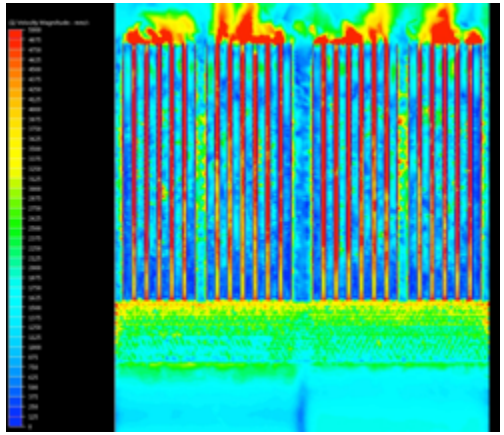
All the bag filters are tailor made designed in order to increase the product performances vs. the possible savings of engineering costs that can be achieved with the modular design.

For each type of application we have developed different type of design of our products.

A bag filter for the dedusting of kiln and raw mill is different from the ones of a cement mill. Also the operating parametrs are different depending from the application.

Bag Filters – Tailor Made Design

As the bag filters are basically static machines, it is of utmost importance the design during the engineering phase. To obtain a lower pressure drop, we are designing our bag filters taking in consideration several parameters. Than the gas distribution is checked with CFD simulation analysis.



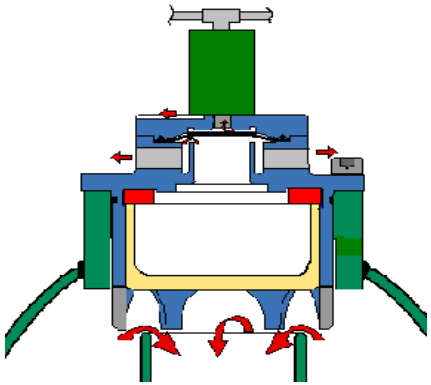
Bag Filters – Bags and Pulse Valves

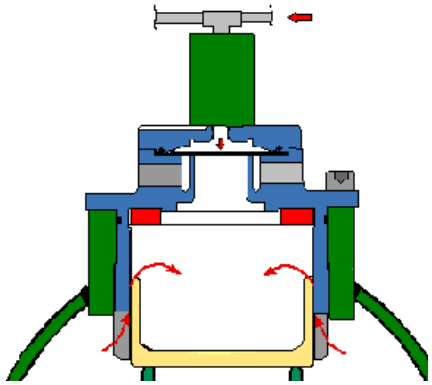
Bag length and fixation

Boldrocchi has realized and can install bag filters with bag length up to 8 m. The bags are fixed to the tube sheet with snap ring.

Pulse valves

Boldrocchi uses valves by Autel, Goyen Mecair and Asco. The valves are “full immersion” type, that grant an higher efficiency and lower pressure drop inside the valve body. For bag with length up to 6 m, the valve’s diameter is 1” ½ , for longer bags 2” valve are used. The number of bags connected to each valve is limited to 14 (in cement plant applications) and to 18 in other applications (steel plants).





Bag Filters – Bags and Pulse Valves

Blowing pipes

The compressed air is conveyed to the bags by blowing
pipes, steel made.
The minimum radius of the blowing pipes is 150 mm.
The holes are with different diameter to assure an equal distribution of the compressed air.

Cages

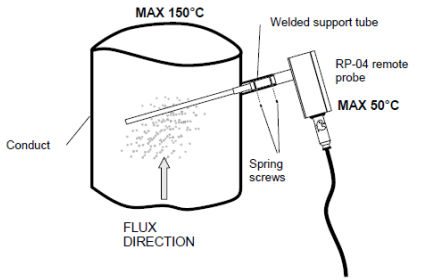
Depending on the fabric type, the cages are realized with 12 wires (polyester, acrylic, P84, PPS, Nomex, etc.) or 20 wires (fiberglass with PTFE membrane, PTFE on PTFE).

Cages can be in single piece or divided in more pieces according to the length.

Bag Filters – Online trouble shooting

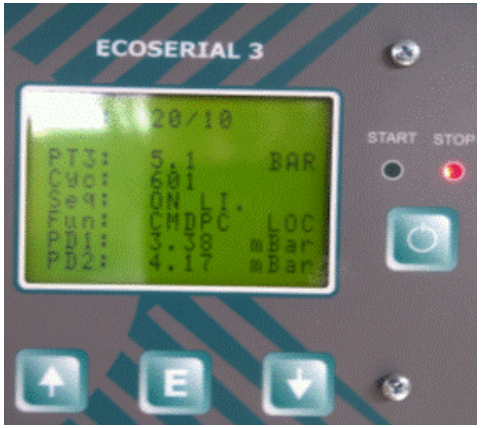
Broken Bag detection

On process bag filters can be installed a tribo electric sensor to detect broken bags and exclude from the cleaning cycle the correspondent pulse valve to prevent dust emission.



Pulse Valve malfunction

Pressure transmitters installed on each air tank receivers to detect malfunction of the pulse valves.



Compressed air

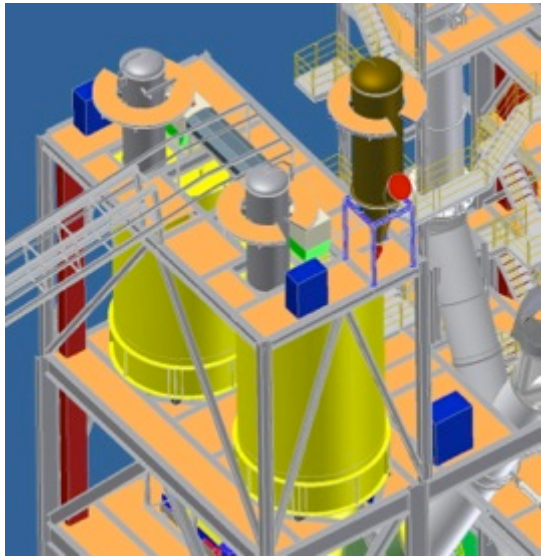
Pressure transmitter on the compressed air line to detect malfunction of the compresses air system.

Bag Filters – Penthouse

To protect the cleaning system and to facilitate the maintenance operation, different type of penthouse can be realized:

- only roof
- complete penthouse (preferred)

In both cases we always foresee sliding structures with manual winch to help the opening of the plenum doors



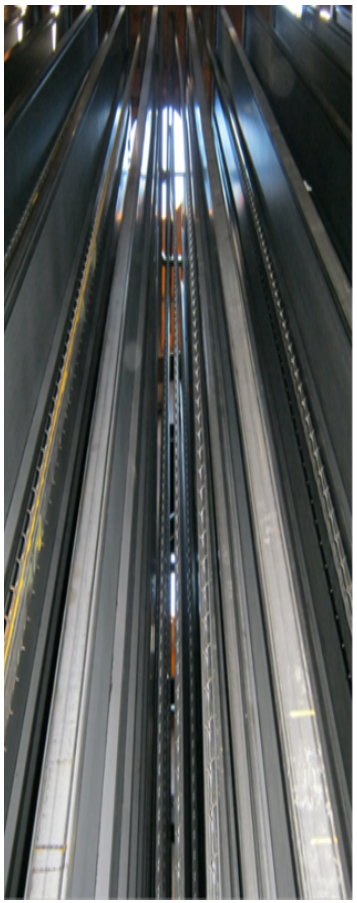
ESP & HYBRID FILTERS

ESP – Design

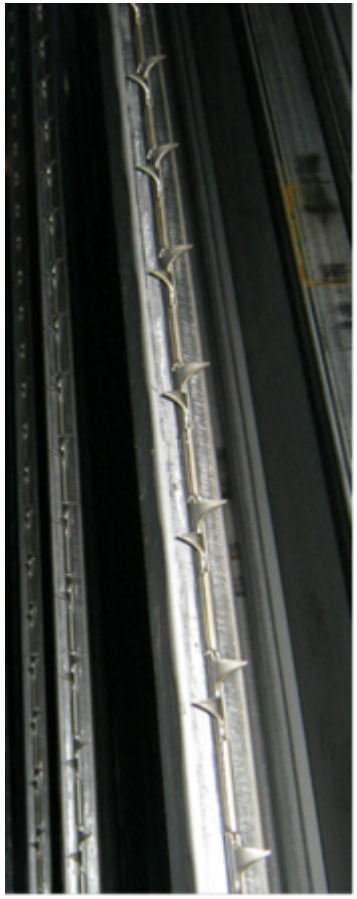
Should it be a ***new equipment***, or an ***obsolete one to be upgraded***, the following topic features are the base of the excellent performances of Electrostatic Precipitators designed and installed by Boldrocchi.

- Proprietary design and in-house manufacturing of electrodes
- Boldrocchi electrodes are individually suspended at their top with the opposite end free for thermal expansion
- Boldrocchi electrodes can be easily and individually removed through the maintenance opening on the ESP roof
- Size and soundness of electrodes as well as the pitch of channels inside the ESP allow the use of 110 kV high voltage feed
- The presence of collecting baffles at the end of each field dramatically increases the efficiency of dedusting
- Thanks to the soundness of electrodes, heavy and powerful hammers can be used for the rapping operation

ESP – Design



Size and soundness of electrodes as well as the pitch of channels inside the ESP allow the use of 110 kV high voltage feed



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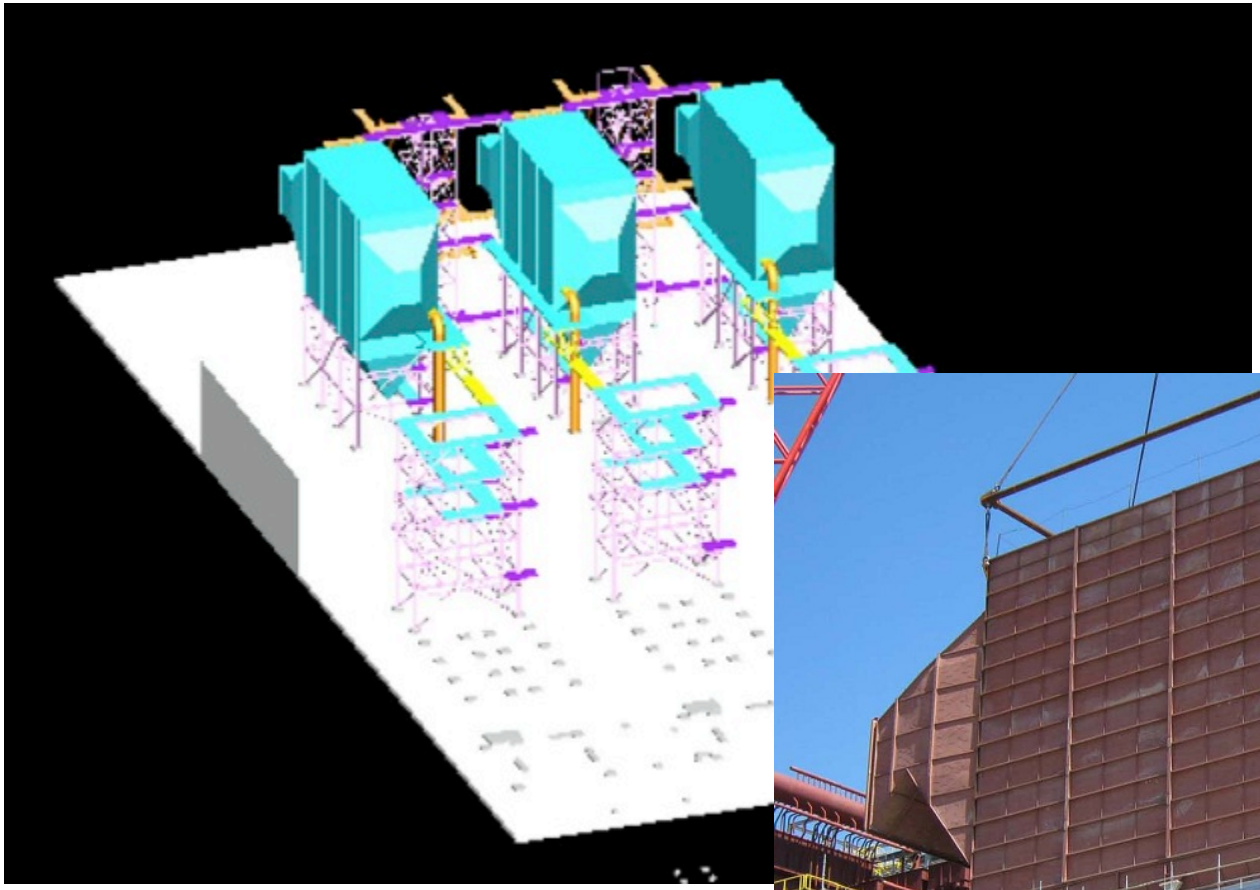
ESP – Design

Thanks to the soundness of electrodes, heavy and powerful hammers can be used for the rapping operation

ESP

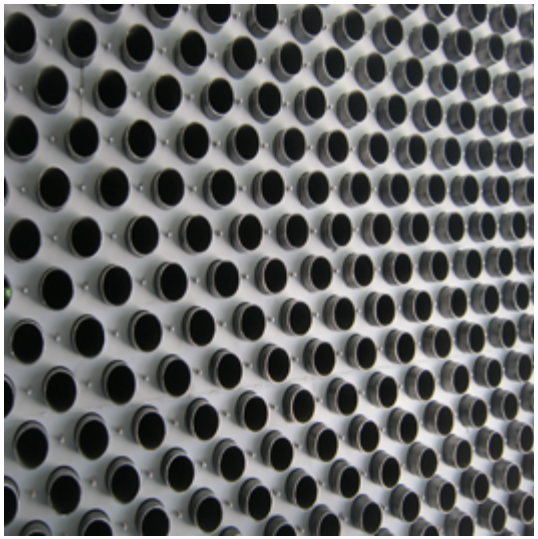


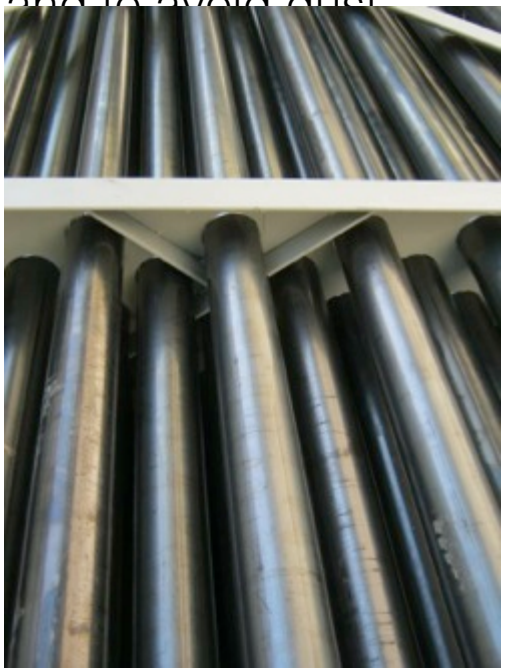
HEAT EXCHANGERS

Air-air Heat Exchangers - sizing

The Boldrocchi air-air heat exchangers are designed to last for long time.

This statement is possible as Boldrocchi engineers
applies strict design parameters in the dimensioning the heat exchangers, to improve the process performances and to avoid dust abrasion.

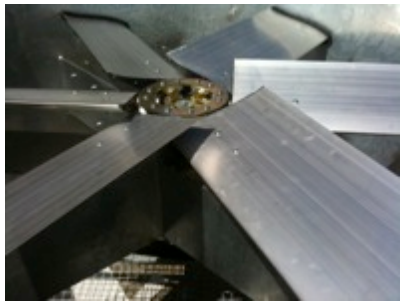


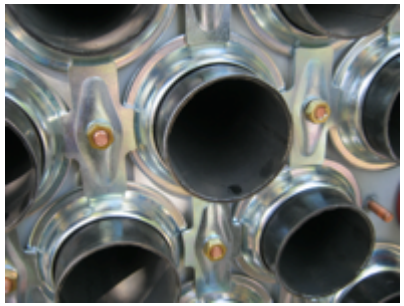


Air-air Heat Exchangers - sizing

The following are parameters that always have been taken in consideration:

- Maximum inlet temperature up to 450 °C
- Maximum mass velocity inside the tubes < 8,5 kg / m^2s to facilitate the heat exchange
- Maximum average velocity in the pipes < 15 m/s
- Large axial fans, to guarantee the necessary gas flow, with low noise emission



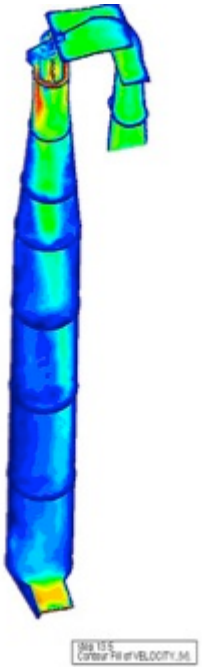


GAS CONDITIONING TOWERS

Gas Conditioning Towers – sizing

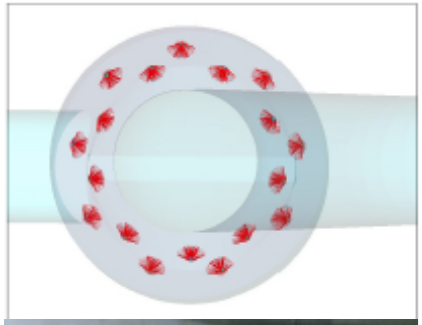
The Boldrocchi Gas Conditioning Towers are designed to obtain a proper gas distribution at the starting of the cylindrical part, where the nozzles are installed.

Water injection can be done with two types of injection system:
-one phase compressed water (“flow back system”);
-two phases system (water mixed with compressed air).

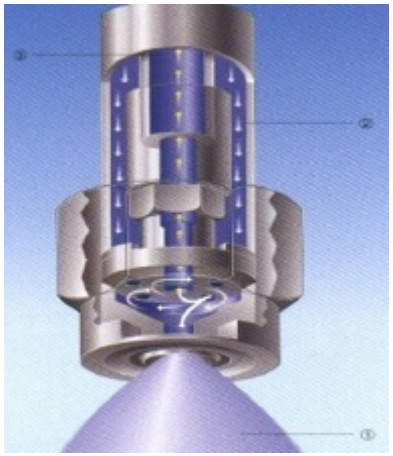


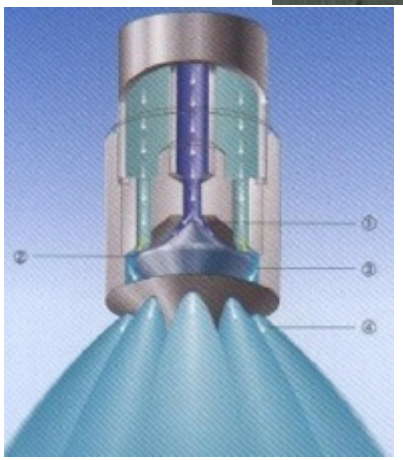
Gas Conditioning Towers – sizing

The first type of nozzles are the spillback one, operated only with high pressure water. Size of the drops is bigger, consequently the GCT is becoming bigger. With this type of nozzles the capital investment is higher, but the operating costs are cheaper.



The second type is with dual fluid, water and compressed air: with this type of nozzles the water drops are smaller, though the evaporation time is shorter. The result is a smaller GCT, but with higher operating costs.

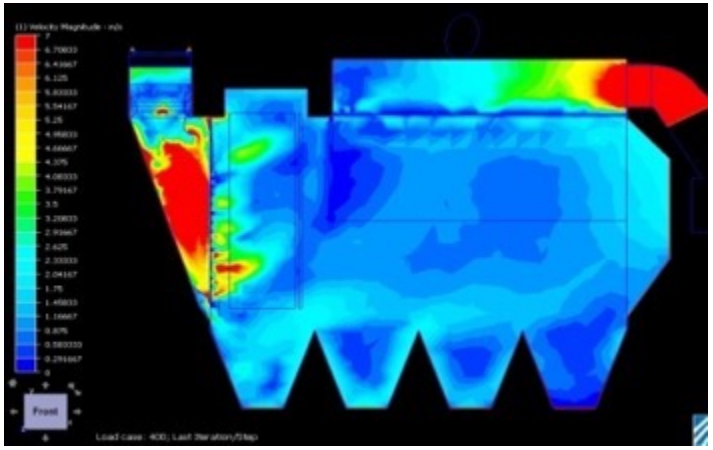




CASE STUDY

Domicem – San Cristobal

Location:	Dominican Republic
Application:	Kiln, Raw Mill and Clinker Cooler
Hybrid Filter:	BEP 1421-179 A + BC 7523-24-13-PD-A
Gas Flow:	800.000 m^3/h
Temperature:	225 °C
Filtration area:	13.410 m^2
Bags:	7.500 mm length Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,00 $m^3/m^2/min$
Electrodes:	14.000 mm length



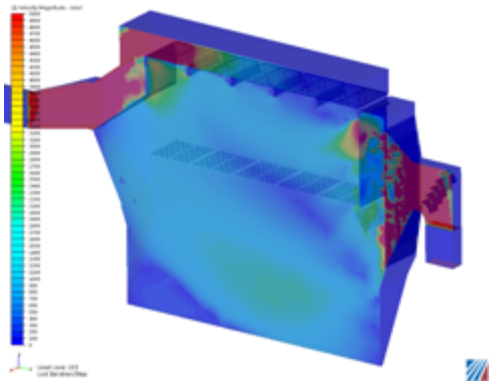
Air Pollution Control division – Steel Industry

Revamping of dedugsting plant for EAF line and insertion of vertical preseparator cyclones

Flow rate : 2 x 1.000.000 mc/h, EAF 70 tons

Norcem – Kjøpsvik

Location:	Norway
Application:	Kiln and Raw Mill
Bag Filter:	BC 6515-14-12-D-B
Gas Flow:	314.000 m^3/h
Temperature:	150 °C
Filtration area:	5.215 m^2
Bags:	6.500 mm length
	Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$



Air Pollution Control division – Steel Industry

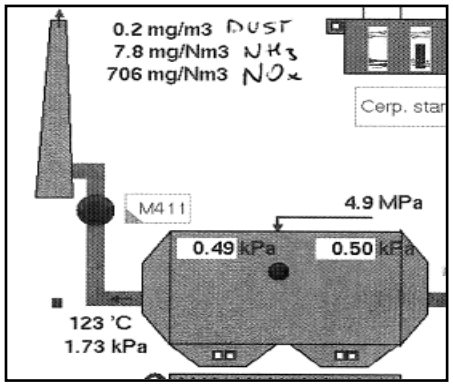
Pulse jet bag filter, evaporating cooling chamber, exhaust fans, axial cyclone

Flow rate: 850.000 mc/h, EAF 60 tons

Českomoravsky Cement – Mokra Kiln 2

The test was executed 2 months after start up, with the following results:

Parameter	Guaranteed	Measured
Dust emission	< 10 mg/Nm^3	<1 mg/Nm^3
Pressure drop	< 12 mbar	< 7 mbar
Fan power consumption	< 200 kW	143 kW



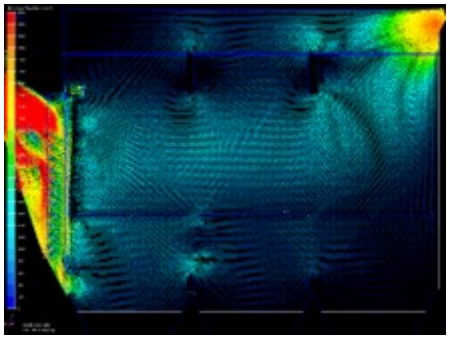
Air Pollution Control division – Steel Industry

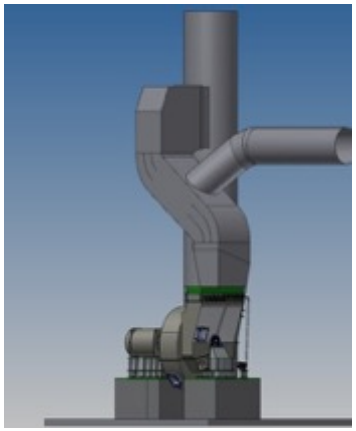
Revamping and capacity increasing of dedusting plant for EAF

Flow rate : 1.300.000 mc/h, EAF 70 tons

Akçansa Çimento A.S. – Büyükçekmece Trass Mill

Location:	Turkey
Application:	Trass Mill
Bag Filter:	BC 6523-13-12-PD-C
Gas Flow:	350.000 m^3/h
Temperature:	150 °C
Filtration area:	5.810 m^2
Bags:	6.500 mm length Acrylic with PTFE coating
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$





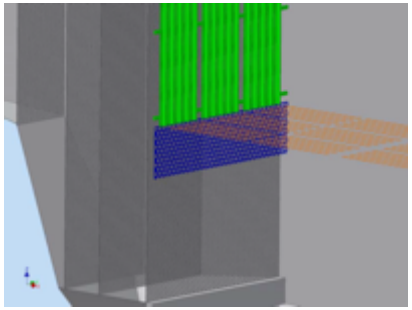
Air Pollution Control division – Steel Industry

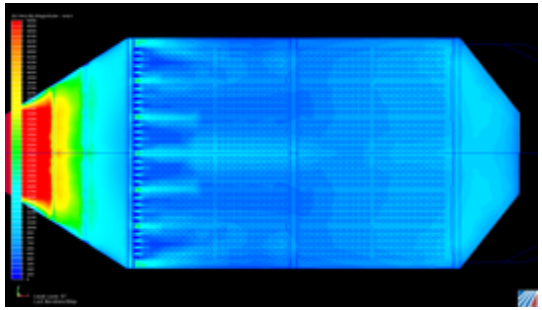
Insertion of new preseparator cyclone on dedusting plant for EAF

Flow rate : 1.200.000 mc/h, EAF 70 tons

Akçansa Çimento A.S. – Büyükçekmece Kiln 3

Location:	Turkey
Application:	Kiln and Raw Mill
Bag Filter:	BC 8022-15-12-PD-C
Gas Flow:	330.000 m^3/h
Temperature:	150 °C
Filtration area:	5.501 m^2
Bags:	8.000 mm length Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$





Air Pollution Control division – Steel Industry

Dedusting plant for screening and crushing limestone and dolomite “PCA” steelmaking shop.

Flow rate : 500.000 mc/h

Akçansa Çimento A.S. – Büyükçekmece Kiln 2

Location:	Turkey
Application:	Kiln and Raw Mill
Bag Filter:	BC 8023-16-12-PD-C
Gas Flow:	526.000 m^3/h
Temperature:	150 °C
Filtration area:	8.802 m^2
Bags:	8.000 mm length Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$

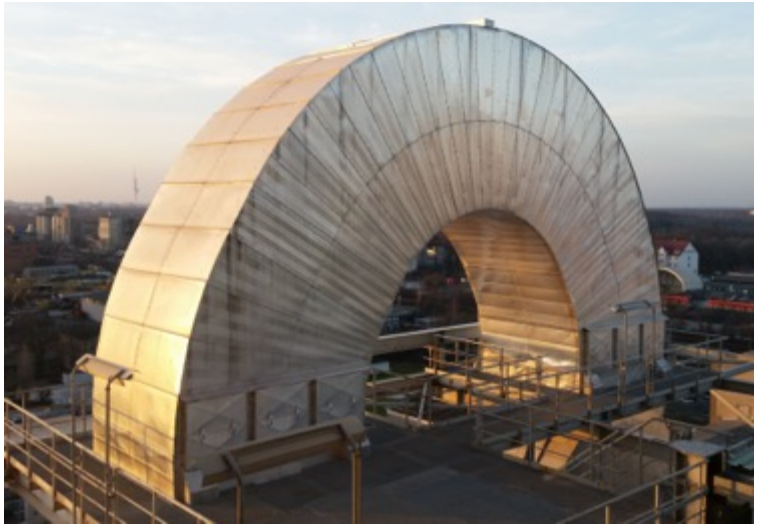
Air Pollution Control division – Steel Industry

Dedusting plant with quenching tower, booster, bags filter and exhaust fans

Flow rate : 2.000.000 mc/h, EAF 2 x 100 tons

HeidelbergCement AG – Hannover

Location:	Germany
Application:	Kiln and Raw Mill
Bag Filter:	BC 8023-24-11-PD-C
Gas Flow:	620.000 m^3/h
Temperature:	125 °C
Filtration area:	12.652 m^2
Bags:	8.000 mm length PPS with PTFE coating
Air-to-Cloth ratio:	0,82 $m^3/m^2/min$



Akçansa Çimento A.S. – Büyükçekmece Kiln 1

Location:	Turkey
Application:	Kiln and Raw Mill
Bag Filter:	BC 8022-15-12-PD-C
Gas Flow:	326.000 m^3/h
Temperature:	150 °C
Filtration area:	5.501 m^2
Bags:	8.000 mm length
	Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$

Cementir – Maddaloni

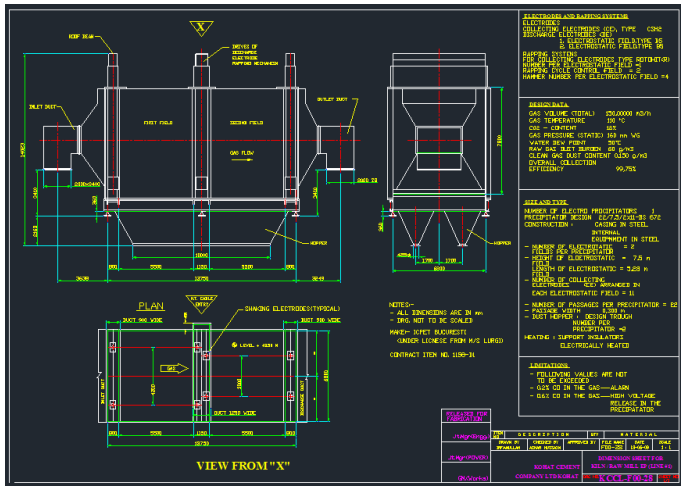
Location:	Italy
Application:	Kiln and Raw Mill
Bag Filter:	2xBCF-6022-16-10-PD-C
Gas Flow:	466.000 m^3/h
Temperature:	240 °C
Filtration area:	7.721 m^2
Bags:	6.000 mm length
	Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$

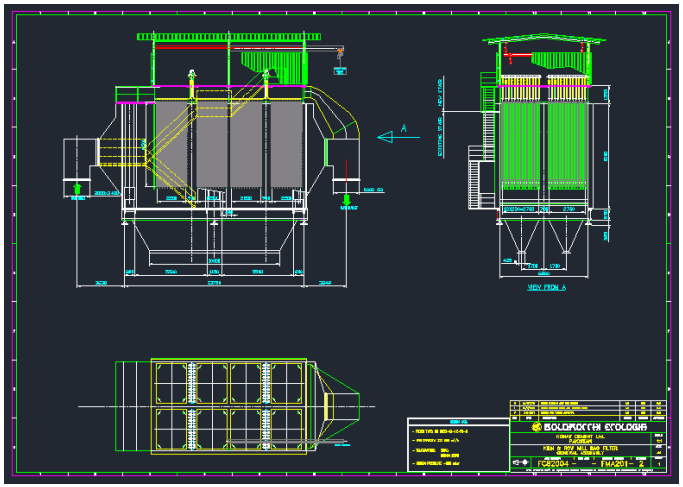
Zuari Cement – Yerraguntla Kiln 3

Location:	Yerraguntla - India
Application:	Kiln and Raw Mill
Bag Filter:	BC 8023-209 PD-A
Gas Flow:	492.000 m^3/h
Temperature:	220 °C
Filtration area:	8.252 m^2
Bags:	8.000 mm length Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$

Kohat Cement – Kohat

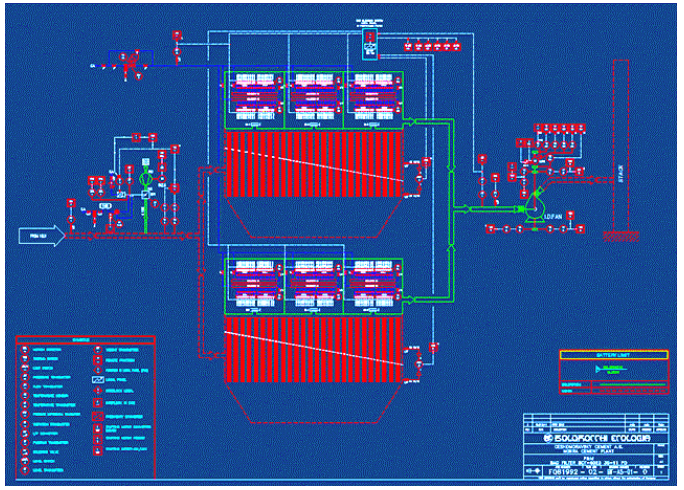
Location:	Pakistan
Application:	Kiln and Raw Mill
Bag Filter:	BC 6522-13-12-PD-C
Gas Flow:	232.000 m^3/h
Temperature:	240 °C
Filtration area:	3.874 m^2
Bags:	6.500 mm length
	Fiberglass with PTFE membrane
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$

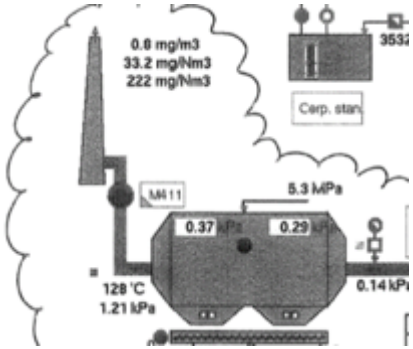




Českomoravsky Cement – Mokra Kiln 1

Location:	Czech Republic
Application:	Kiln and Raw Mill
Bag Filter:	BC 6023-19-11-PD-C
Gas Flow:	381.000 m^3/h
Temperature:	190 °C
Filtration area:	7.186 m^2
Bags:	6.000 mm length PPS with PTFE coating
Air-to-Cloth ratio:	0,90 $m^3/m^2/min$



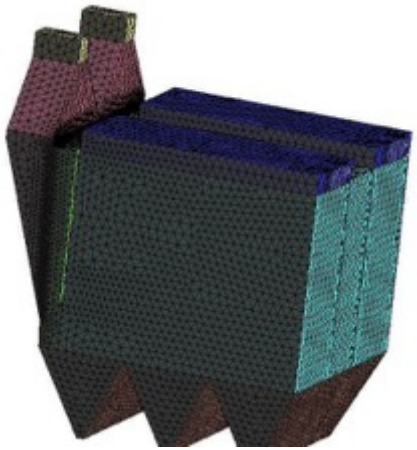


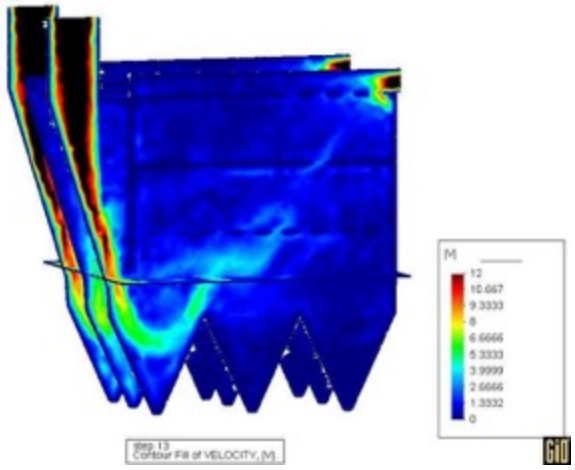
Českomoravsky Cement – Mokra Kiln 2

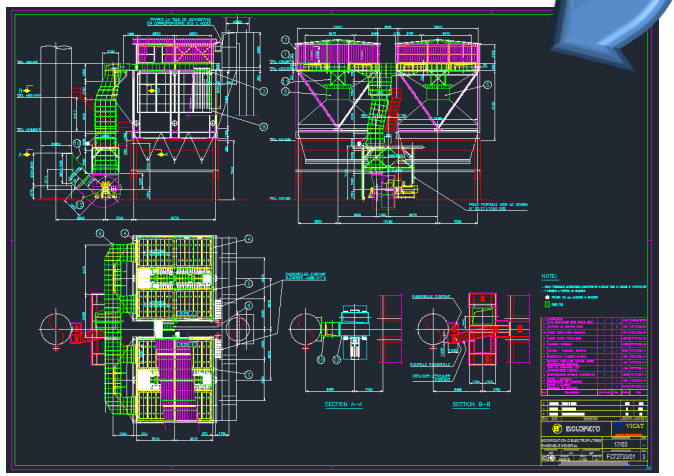
Location:	Czech Republic
Application:	Kiln and Raw Mill
Bag Filter:	BC 6023-19-11-PD-C
Gas Flow:	381.000 m^3/h
Temperature:	190 °C
Filtration area:	7.186 m^2
Bags:	6.000 mm length PPS with PTFE coating
Air-to-Cloth ratio:	0,90 $m^3/m^2/min$

Ciments Vicat – Grave de Peille

Location:	France
Application:	Kiln and Raw Mill
Bag Filter:	BC 6523-13-12-PD-B
Gas Flow:	410.000 m^3/h
Temperature:	200 °C
Filtration area:	6.362 m^2
Bags:	5.000 mm length P84
Air-to-Cloth ratio:	1,0 $m^3/m^2/min$







Air Pollution Control division – Steel Industry

Dedusting plant with quenching tower, booster, bag filter and exhaust fans

Flow rate : 2.000.000 mc/h, EAF 2 x 100 tons

Worldwide Presence

Direct Main Customers

ABB GROUP • ABENER • A2A • AIR PRODUCTS • AKCANSA CIMENTO • ALSTOM • ANSALDO ENERGIA • ANSALDO CALDAIE • API • AREVA • AVIO • B.I.H. • BRUSH HMA • BUZZI UNICEM • B.W.E. • CALLIDUS • CALME • CEMENTOS MOCTEZUMA • CEMENTIR • CHIYODA • CNIM • COLACEM • DAELIM • DANIELI • DOW CHEMICAL • EDISON • ENEL • ENI •ENICHEM • ENDESA • ESSAR STEEL • ESSO • EVC • FCB • FINCANTIERI • FLUOR • FOSTER WHEELER • GE OIL & GAS NUOVO PIGNONE • GS ENG. & CONSTR. • HALLIBURTON / KBR • HEIDELBERG • HEURTEY • HOLCIM • HOWDEN COMPRESSORS • ILVA • ISG • ITALCEMENTI • JSPL • JSW • KHD • KRUPP POLYSIUS • KTI • KUWAIT NAT. PETROLEUM Co. • LARSEN & TOUBRO • LAURENCE SCOTT • LINDE • LOESCHE • LUMMUS GLOBAL • LURGI • LAB • MAN FERROSTAAL • MACCHI • METSO POWER • MITSUBISHI HEAVY INDUSTRIES • NEM • NEUMAN-ESSER • NOOTER ERIKSEN • PDIL • PETROBRAS • PFEIFFER • PILLARD • QAFCO • RAFFINERIA DI ROMA • RELIANCE • RENCO • REPSOL • RIVA • SACCI •SAIL • SAIPEM • SAMSUNG • SARAS • SELAS LINDE • SICES • SIEMENS • SIIRTEC NIGI • SIV • SKEK • SK ENG AND CONSTR. • STONE & WEBSTER • TAMINI • TATA • TECHINT • TECHNIP COFLEXID • TECNIMONT • TENOVA • TERMOMECCANICA • TIRONI • TOSHIBA • TOTAL • TOYO • TRACTEBELL • UHDE • VASSILIKO CEMENT • VATECH • VICAT • VOEST ALPINE • VOTORANTIM • WEG

BOLDROCCHI

ESTABLISHED IN 1909

GROUP HEADQUARTER
Viale Trento e Trieste 93 • 20853 Biassono (MB) • Italy T.
+39 039 2202.1 • F. +39 039 2754200
E-mail: boldrocchi@boldrocchi.eu • **www.boldrocchi.eu**