



Range of Products

Process Fans & Blowers

Dust Extraction System (D.E.System)

Bag House (Bag Filter System)

Electrostatic Precipitator (ESP)

Scrubber (Dry & Wet)

Cyclones

Multi Cyclones

Dense Phase Pneumatic Conveying System

Rotary Air Locks

Pneumatic Husk Conveying Systems

Dampers

Heavy Fabrication

MULTIVENT ENGINEERS

Works:

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AN ISO 9001 : 2000 CO. AN OHSAS 18000 : 2007 CO. AN ISO 14001 : 2015 CO.

About IRMA PS



IRMA Projekt Sistem Ltd. was founded in 1992 and since then it has been successfully operating in the field of air pollution control to meet the needs of different industries, such as power generation, mining & mineral processing, cement, steel & metal industry, glassworks, pulp & paper, plastic, wood & food industry and many others.

Our main mission is to deliver exceptional service and products, innovative, cost-effective solutions to air pollution problems through energy saving applications, to provide quality design and project management with the very latest in environmental technology.

In response to ever tightening environmental legislation and increasingly competitive commercial climate, IRMA Projekt Sistem is committed to the expansion and development of its core technologies and to a continuous promotion of expertise and know-how that will secure a flexible approach and offer a diversity of options that will best suit the needs and resources of our customers.

IRMA PS offers complete turnkey services providing innovative solutions and professional services focused on design, installation, supervision, maintenance, revamping & upgrading of projects, preparation of studies and analyses, emission measurement, technical support, consulting etc. With the view to promoting environmental standards we are broadening the scope of our activities to other areas such as petrochemistry, applied thermal technologies & thermal engineering.

With decades of experience and a remarkable reference list of projects implemented in Serbia,

Montenegro, Bosnia & Herzegovina IRMA PS has established itself as the regional leader in the air pollution control, at the same time successfully expanding operations in foreign markets, such as Russia, UK, Germany and Brazil.

Quality Policy

We the staff and Management at Multivent Engineers are committed to:

- Design, Manufacture, Sales & Service, Timely delivery of our equipments.
- To meet the Quality requirements of the customers.
- To ensure the business growth through customer satisfaction at competitive prices.
- To continually improve the applied Quality Management System with close cooperation and involvement of all employees and business associates.

Our Managing Director







Our Works







Machinery & Infrastructure











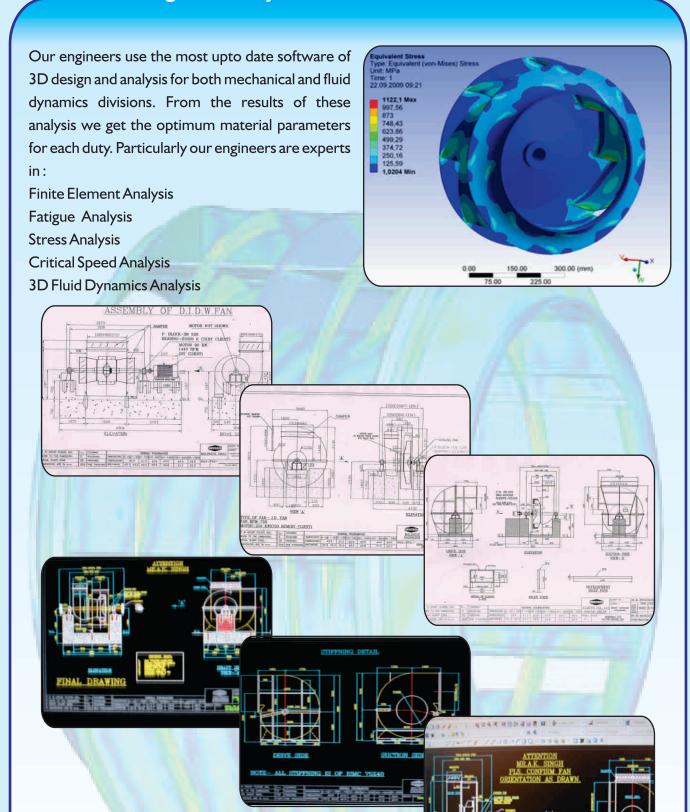








Design & Analysis



Key Advantages

- Widest possible choice of options
- Largest standard range of industrial fans available.
- New designs offer high efficiencies & lower running costs
- Sound levels are substantially below those of conventional fans

Key Features

- Capable of handling any duty
- 23 standard diameters
- 12 widths, 8 impeller types & choice of drive arrangements
- Single or Double inlet
- Sound level reduced by upto 3 dB
- High efficiencies upto 87%.

Types of Fans

AXIAL FANS-SERIES AFX

Sizes upto 1600 mm Diameter.

Fixed, Adjustable, Pressure Die Cast blades available Duty range from 1000 CFM To 40000 CFM against 4 Inch Pressure



LARGER SIZES • HIGHER DUTIES • SPECIAL REQUIREMENTS AVAILABLE ON REQUEST

MODELS AVAILABLE

- Standard Axial Flow Fans
- Ventilation Fans
- Contra Rotating Axial Fans
- Bifurcated Fans
- Axial Fans For Marine Application





Centrifugal Fans - Series 28

MODELS AVAILABLE

- Small & Medium Duty Fans
- Large Duty Fans
- Heavy Duty Custom Built Fans

Small & Medium Duty Fans

- Wheel Dia. 315 mm to 900 mm
- Arrangement Belt Drive, Direct Drive, Cantilever
- Accessories available as required

Large Duty Fans

- Wheel Dia. I 000 mm to 2000 mm
- Arrangement Belt Drive, Direct Drive, Cantilever, Overhung
- Accessories available as required

Heavy Duty Custom Built Fans

Wheel Dia. > 2000 mm

- Arrangement Belt Dive, Direct Drive, Simply Supported
- Accessories available as required

Material Available

- Mild Steel-MS
- Stainless Steel-SS
- High Alloy
- Sail Hard, Sailma Series
- TISCRAL

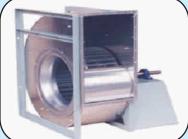
Other Services

- Site measurements of technical parameters
- On site & off site balancing
- Bearing monitoring / vibration analysis
- Annual maintenance contracts (AMC)
- Retrofitting of impellers & shafts as per our design
- Retrofitting of impellers & shafts as per OEM design

AEROFOIL IMPELLERS BACKWARD CURVED IMPELLERS BACKWARD INCLINED IMPELLERS 80% PEAK STATIC **RADIAL TIPPED IMPELLERS** 75% PEAK STATIC RADIAL BLADED SHROUDED IMPELLERS 73% PEAK STATIC RADIAL BLADED OPEN IMPELLERS 63% PEAK STATIC

Light Duty Range







Applications

- Oven and dryer systems
- Pneumatic Conveying
- Clean-Side dust collection
- HVAC ventilation
- Air recirculation
- Air Knives
- Chemical Process
- Combustion Air
- Building Ventilation
- Fume removal
- Spray Booth exhaust
- Cooling

Small & Medium Range







Applications

- Dust Collection
- Pneumatic Conveying
- Scrubber Exhaust
- Combustion Air
- Pollution Control
- Incineration
- Fume-hood exhaust
- Dryer Applications
- Chemical Applications
- Forced Draft
- Induced Draft









Large & Heavy Duty Range









- Cement Plant
- Steel Plant
- Power Plant
- Sugar Plant
- Paper Plant
- Boilers
- Food Processing
- Textiles
- HVAC
- Tunnel Ventilation
- Processing















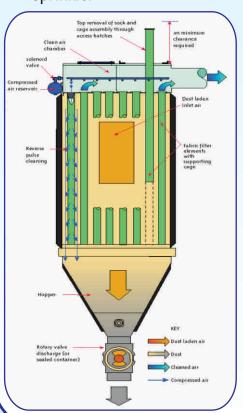
Dust Collection System

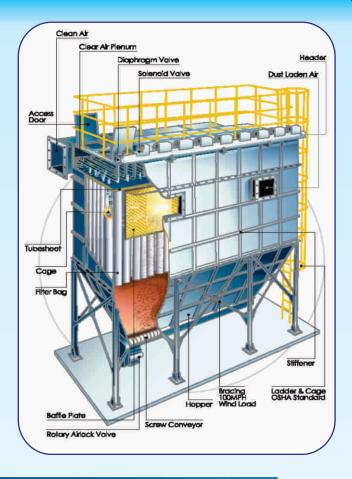
Characterstics

- High Efficiency filter bags selected for the specific application
- Heavy duty all welded construction
- Special pressure guage
- Access platforms and ladders
- Easily changeable bags

Options

- Explosion Vents
- Material Handling Systems
- Photohelic pressure guage for pressure demand cleaning
- Special Finishes
- High Temperature construction
- Inlet and Outlet dampers
- Offline Cleaning
- Sprinkler





The Development of the Fabric Filter

The first fabric filters, designed many years ago comprised a simple fabric bag (or series of bags) into which the dust laden air was blown to remove the contaminants. Inevitably the filter bags or sleeves became clogged with dust fairly quickly and various devices such as shakers were incorporated to increase the operational life of the filter elements before cleaning was needed. The pulsejet filter has been developed more recently and is now widely recognised as the most efficient type of fabric filter available. The dust laden air is introduced via an entry manifold at the top of the filter dust chamber or in the case of very high dust loadings into a separate inlet aisle. Heavy particles will be deflected directly into the hopper while lighter particles are drawn onto the outside of the filter socks to form a dust cake. Periodic pulsing of the filter socks (row by row) dislodges the dust cake into the hopper and thus maintains fabric permeability at a level which allows continuous operation.

The pulse, a short burst of compressed air, and clean air induced by the sonic nozzle pulse, causes a pressure wave to travel down the filter sock, inflating the fabric and dislodging the dust.

Simultaneously the airflow is momentarily reversed, further assisting dust removal. The design of filters includes a high level entry which provides a downward movement in the dust chamber, further assisting to deposit dust in the hopper and avoiding the common problem of loss of efficiency due to re entrainment.

High Efficiency Cyclones

Cyclone dust collectors, named after the cyclone weather phenomenon, are large funnel shaped sheet metal tubes connected to ducts often used in woodshops, machine shops, manufacturing plants, and powder processing plants. Dust and debris are sucked in at the top. Air containing fine dust blows out of the other side of the top, while chips and large dust particles fall out of the bottom into a drum or bin. Dusty exhaust air is either blown outside or filtered again using media filtration.

IN

Cyclones or Centrifugal Collectors

Cyclones (or centrifugal collectors) create a 'cyclonic' or centrifugal force similar to water going down a drain to separate dust from the polluted air stream. The centrifugal force is created when dust filled air enters the top of the cylindrical collector at an angle and is spun rapidly downward in a vortex (similar to a whirlpool action). As the air flow moves in a circular fashion downward, heavier dust particles are thrown against the walls of the collector, collect, and slide down into the hopper.

Cyclone Collector Design Considerations

Cyclone dust collector efficiencies depend on :

- a. particle size (particles with larger mass being subjected to greater force),
- b. force exerted on the dust particles and,
- c. time that the force is exerted on the particles

Cyclone dust collectors can be designed with either large or narrow diameters depending on the application. Small diameter cyclones have high dust collection efficiencies at low dust loads (0.1 to 6 grains per cubic foot) and high pressure drop of 6 to 10 inches w.c. (water column). Owing to the small diameter they have the tendency to plug at high dust loads. large diameter cyclones can handle high dust loads (50-100 grains per cu.ft) with low pressure drops (1.5 to 3 inch w.c.) efficiently. They are not very efficient at low dust loads.

To improve efficiencies, design considerations are,

- a. high narrow inlets reduce distances traveled by dust to the wall and thereby improve collection efficiencies
- b. small diameters have higher forces than larger diameter cyclones
- c. smooth transition ensures maximum efficiency.

Use of Expansion Hoppers in Dust Discharge

In high pressure drop cyclones, dust collecting at the discharge point could be swept upward to the outlet tube. This phenomenon occurs due to the powerful inner vortex that is formed inside the main swirling stream at the discharge point. Use of expansion hoppers allows dust to be discharged through an airtight feeder. Expansion hoppers effectively squeeze out moisture in some heavy moisture applications.

Other Products

Multi Cyclones, Trima Cyclones



Pneumatic conveying system transfers powders, granules, and other dry hulk materials through an enclosed horizontal or vertical conveying line. The motive force for this transfer comes from a combination of pressure differential and the flow of air (or another gas) supplied by an air mover, such as a blower or fan. By controlling the pressure or vacuum and the airflow inside the conveying line, the system can successfully convey materials.

Pneumatic conveying provides several advantages over mechanical conveying. A pneumatic conveying system can be configured with bends to fit around existing equipment, giving it more flexibility than a mechanical conveyor with its typically straight conveying path. This also means the pneumatic conveying system occupies less space than acomparable mechanical conveyor. The pneumatic conveying system is totally enclosed, unlike many mechanical conveyors, which enables the pneumatic system to contain dust. The pneumatic conveying system typically has fewer moving parts to maintain than a mechanical conveyor, as well.

Dense Phase

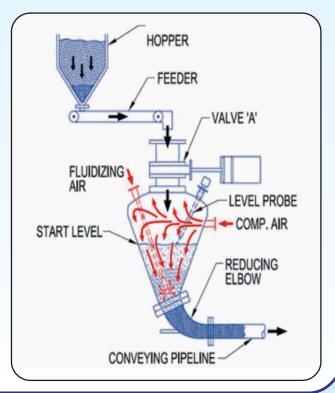
In dense-phase conveying, particles aren't suspended in the conveying air and are transported at high pressure and low velocity.

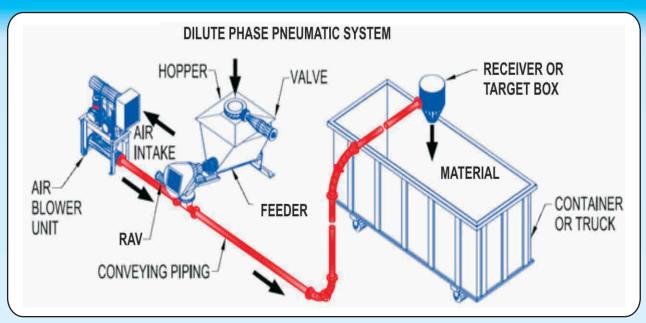
Dense-phase pressure conveying is suitable for gently conveying fragile or abrasive materials with particles ³/₄ inch and smaller over long distances. Commonly handled materials include silica sand, feldspar, fly ash, glass cullet, alumina, glass batch mix, carbon black. sorbitol, dextrose, candies,

resins, cocoa beans, hazelnuts, and puffed rice cereal. The system conveys material at a relatively low speed to reduce material degradation, air consumption, and abrasion on pipeline, bend, and diverter contact surfaces. This system can also stop or start with the conveying line full of material.

Pneumatic conveying also has some disadvantages compared with mechanical conveying. One is the pneumatic conveying system's typically greater use of horsepower than a mechanical conveyor, resulting from the pneumatic system's need to change air pressure to produce conveying power. The pneumatic conveying system also uses a comparatively larger dust collection system than a mechanical conveyor because the pneumatic system has to separate the material from the conveying air at the system's end. Some materials also have characteristics that make them difficult to convey in a pneumatic system. Examples are materials with a large particle size and high bulk density, such as gravel or rocks, and extremely sticky materials, such as titanium dioxide, which tend to build a coating on material-contact surfaces and can eventually block the conveying line. Pneumatic conveying systems are classified by their operating principle into two basic types: Dilute phase and dense phase. Either can run under pressure or vacuum.

MODEL Denzvey





Dilute Phase

MODEL TURBOPAC

In dilute-phase conveying, particles are fully suspended in the conveying air and transported at low pressure and high velocity. Dilute-phase pressure conveying is one of the most common conveying methods for powders or granules.

In this method, illustrated as above, a blower at the system's start supplies a high volume of low-pressure air to the system, and material is fed into the conveying line through a rotary airlock valve. The system relies on the airstream's velocity to pick up and entrain each particle, keeping the particles in suspension as they travel through the conveying line. The dilute-phase pressure conveying system requires relatively little headroom and is simple to operate, economical, and ideal for conveying material from a single source to multiple locations.

Dilute-phase vacuum conveying is suitable for conveying materials that tend to pack or compress under pressure & must not leak into the workplace air. This system is typically used to convey materials over distances at low capacities. Dilute-phase vacuum conveying requires minimal headroom at the feed point and is ideal for conveying material from multiple sources to a single destination.











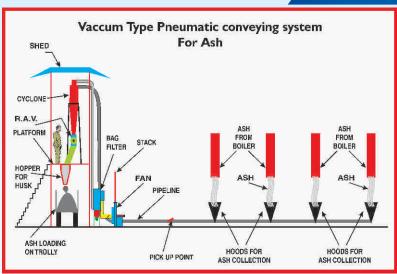


Ash Handling System

Vacuum conveying system is a unique system in itself. It is specially designed to cater to the industry where small space is available for ash disposal. The working of the system is very simple. Ash is sucked in a pipe through a secondary nozzle/hoods by vacuum. Ash is then separated from air by a cyclonic effect created inside the cyclone. Ash then drops down through the RAV on to the platform or ash is collected in the trolley underneath, the dusty air passing through the pulse jet bag filters into the atmosphere through the high efficiency fan.

The pulse jet bag filter is an online system which with the help of compressed air cleans the plant ash filled bags. The advantage of using a pulse jet bag filter is its feature of online cleaning without stopping the whole pet. The fine material after being pulse cleaned is collected in a RAV fitted under the bag filter & disposed off into the trolley. The bends used are made of high grade steel with anti abrasive coating to protect against the abrasiveness of ash. System requires minimum workers to operate for ash.

MODEL VAC-U-PAC













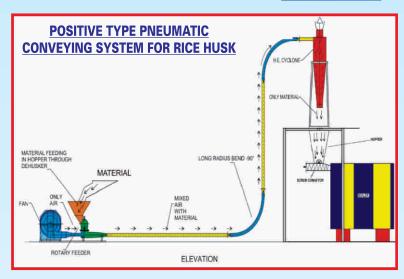


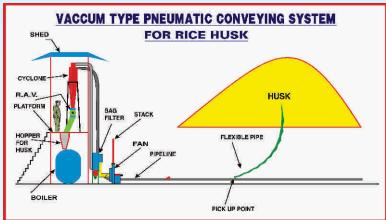
Positive Conveying System

This is positive type of pneumatic conveying system which can be handle maximum capacity of I to I0 TPH of boiler fuel and can throw material at a distance in excess of 800 ft. The system consist of either single stage or a two stage fan or a roots blower which conveys the material through pipe ranging from 4 inch to I2 inch.

The material is fed into the RAV through the material feeding hopper which is pushed by the air thrown by the fan. Long radius bend are used either in 90° or 45° so that the bends do not & wear out. Special material for bends is used to enhance its life. The material is conveyed through the line uptill the discharge point. If required a diverter can be used with the line to divert the material to some other place at one time only one line will convey.

Model Powerpac

















Dampers

Dampers are used to throttle the air entering or leaving a fan and to control airflow in branches of a system or at points of delivery. Dampers control airflow by changing the amount of restriction in an airstream. Increasing the restriction creates a larger pressure drop across the damper and dissipates some flow energy, while decreasing the restriction reduces the pressure differential and allows more airflow.

Single Blade Dampers

This is the cheapest and simple type of damper normally fitted at fan inlet for manual control. This damper is suitable for situations where accurate volume flow is not required.



Multivane Dampers

Control dampers are offered with either parallel or opposed blades. Each style has distinguishing characteristics in regards to control of the fan's performance plus a change in air velocity profile.

Parallel blade dampers have excellent control over the range of 75% to 100% wide open volume due to the amount of control arm swing required to modulate the blades. Parallel blades are used when greater control is required near the top end of the volume operating range or for systems requiring two position (fully open or fully closed) operation. Parallel blades should not be used upstream of critical components due to uneven airflow.

Opposed blade dampers offer the best control over the entire operating range. Opposed blades are used for applications where it is necessary to maintain even distribution of air downstream from the damper. This style of blade is the best selection for ducted outlets.



Type of Dampers

- Backdraft Dampers
- Inlet Box Dampers
- Nested Inlet Vane Dampers
- External Inlet Vane Dampers



Mobile Conveyors

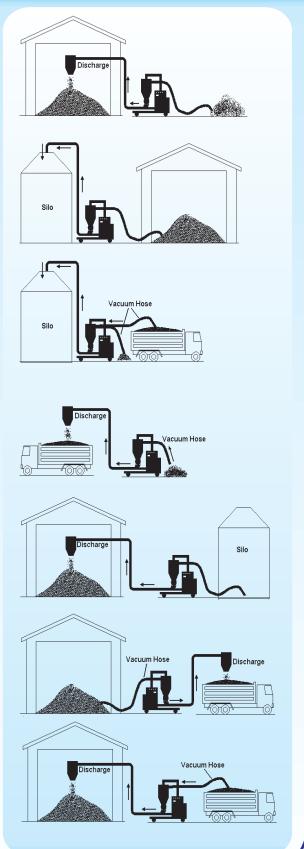
KwikVAC

KwikVAC mobile pneumatic conveying system are used in agriculture, food processing sector. It is capable of vacuuming the bulk solid from one point and transfering it to another point by pressure. A flexible suction hose is used to vacuum the material from basement silo container etc. Bulk material is conveyed to silo, truck, basement etc. by air pressure through the discharge hose. An optional discharge cyclone is connected to discharge hose which provides an easier truck loading. One user is enough for conveying operations. It can be operated by either electrical motor, diesel engine or tractor. Special hinge mechanism lets them to be carried by tractor.

FEATURES:

- Bulk material does not pass through any high speed device like fan or propeller. Therefore no harm is seen on conveyed product.
- Dust Free Operation
- No moving parts like augers
- Product degradation is minimal.
- No adjustment required.
- Longer conveying distance
- In Built Bag Filter System





Our Heavy Machinery















Testimonial





IRMA PROJEKT SISTEM DOO

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CERTIFICATE OF AUTHORISATION ON
JOINT COOPERATION WITH MULTIVENT ENGINEERS FOR
TURNKEY AIR POLLUTION CONTROL (APC) SYSTEMS & INDIVIDUAL APC EQUIPMENT

TO WHOM IT MAY CONCERN

This is to certify that M/s **IRMA PROJEKT SISTEM Ltd.** with their Head Office address at Vladimira Popovica 6 NBGP Apartmani / 210 ,11070 Novi Beograd , Tel: +381 11 71 11407; +381 11 71 11472; +381 11 71 22 084 E-mail: office@irma-ps.com; Web: www.irma-ps.com

AUTHORISES

M/s **MULTIVENT ENGINEERS** to do BUSINESS DEVELOPMENT, MARKETING, SUPPORT FOR EXECUTION for Air Pollution Control Projects in India of all Product Range of IRMA PROJEKT SISTEM

M/s Multivent Engineers & IRMA PROJEKT SISTEM will jointly execute Turnkey Projects or Equipment on Project to Project Basis.

M/s IRMA PROJEKT SISTEM will design, engineer, and Provide Drawings, Layouts, Manufacturing Drawings for local fabrication at Multivent Works Yamunanagar for Each Project.

M/s IRMA PROJEKT SISTEM will be the principal designer for Air Pollution Control Turnkey Systems, Air Pollution Control individual Equipment, Pneumatic Conveying systems and will also be SYSTEM Guarantor for every Project.

IRMA PROJEKT SISTEM Ltd.

Dragan Guzijan, M.M.E. - CEO

Društvo za inženjering, promet i usluge IRMA Projekt Sistem d.o.o. (jednočlano društvo)

PROJEK SISTEM

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IBAN: RS35160005080000260267

UniCredit Bank Srbija a.d. TR: 170 0030027284000-53 IBAN: RS3517000300272840015

SWIFT: BACXRSBG

A FEW PROJECT REFERENCES OF IRMA PROJEKT SISTEM DOO

Wagon Tippler Dust Emission Collection System – Coal Dust Injection for Blast Furnace (Baghouse Capacity 150000 m3/h) Turnkey Project

Customer: US Steel Serbia Ltd. Location: Smederevo, Serbia

Refurbishment & Capacity Upgrade of the Primary Emission Collection System in Steel Mill Hot Metal Desulphurization

Station; Baghouse Capacity 210000 m3/h

Turnkey Project.

Customer: US Steel Serbia Ltd. Location: Smederevo, Serbia

Primary Emission Collection System in Steel Mill Hot Metal Desulphurization Station (Baghouse Capacity 182000 m3/h)

Turnkey Project

Customer: US Steel Serbia Ltd. Location: Smederevo, Serbia Value: 490000 USD

Sevojno Foundry Emission Collection System (Capacity 59000

m3/h)

Turnkey Project

Customer: Sevojno Copper Foundry

Location: Sevojno, Serbia Value: 910000 USD

Emission Collection System at Coke Pusher and Loading Cars

(Baghouse Capacity: 30000 m3/h)

Customer: OAO KOKS, Kemerovo, Russia.

Location: Kemerovo, Russia

Value: 490000 USD

Emission Collection System in the Lead Battery Recycling Plant

(Two Baghouse filters; 85000m3/h; 35000 m3/h)

Turnkey Project

Customer: Trepča Under KTA Administration

Location: Zvečan, Serbia

Pig Casting Machine Emission Collection System, (Baghouse

Capacity30000 m3/h)
Turnkey Project

Customer: US Steel Serbia Ltd. Location: Smederevo, Serbia

EPC, Commissioning, Start-up & Performance Testing of the

Ash Handling System under the ESP on A3 Unit

Customer: PE Electric Power Industry of Serbia – TPP Nikola Tesla, Ltd.

Location: Obrenovac, Serbia

Dust Extraction and Collection in Smederevo Steel Mill Facilities with a 45-kW Heavy Duty Industrial Vacuum Cleaner

Customer: Zelezara Smederevo Ltd..

Location: Smederevo, Serbia

Upgrade & Refurbishment of the Dust Collection System for

Phosphate Packing Machine

Turnkey Project.

Customer: ELIXIR ZORKA – Mineral Fertilizers Ltd.

Location: Šabac, Serbia

Construction & Installation of the Emission Collection System of the Pusher Car at the Coke Plant (Baghouse

Capacity: 2×100000m3/h)

Customer: GOŠA FOM JSC.

Location: USIMINAS S.A. - Ipatinga, Brazil

Process and Mechanical Design for Two-Stage System for Wet Flue Gas Treatment in the Boiler Plant no. 4 –Steam

Generation 100t/h

Customer: ENERGOLINIJA d.o.o. Location: Zvornik, Republic of Srpska

Pneumatic Conveying and Dust Collection System for Rockwool Recycling Line; Maximum Capacity 1200 kg/h of

recyclate; Turnkey Project

Customer: KNAUF Insulation Ltd.

Location: Surdulica, Srbija

Venturi Scrubber for Dust Collection at the Parnaby Preparation Plant for Coal Cleaning (Construction)

Customer: RUDING PRINC'S SON Ltd. Location: Ugljevik, Republic of Srpska

Refurbishment of the Internal Conveying System for Fly Ash Handling from ESP Units for Capacity Upgrade in Gacko

TPP

Turnkey Project

Customer: Urals Power Engineering Company, JSC.

Yekaterinburg, Russia Location: Gacko, B&H

Rehabilitation and Upgrade of Complete Dedusting System in Coal Preparation and Processing Plant Tamnava

in Coal Preparation and Processing Plant Tamnava (Detailed Design)

Customer: Public Enterprise RB KOLUBARA Ltd.

Location: Tamnava, Serbia

Dust Collection System for Rock Phosphate Grinding Plant in

Prahovo Chemical Industry

Turnkey Project

Customer: ELIXIR ZORKA - Mineral Fertilizers Ltd.

Location: Prahovo, Serbia

Wood Pellets Production Facility Emission Collection System

(Baghouse Capacity 20.000 m3/h)

Turnkey Project

Customer: Gotta Pellets Ltd. Location: Bajina Bašta, Serbia