



ENGINEERING · DESIGN · EQUIPMENT · AUTOMATION

Catalog of Solutions

Integrated engineering solutions for the mining-and-processing and
beneficiation industries

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Today, Anod Engineering is a modern engineering company specialising in delivering integrated engineering solutions for mining-and-processing and beneficiation enterprises. The company's specialists have been working successfully in the industry since 2000.

2000

year we entered the industry

80%+of Ukraine's processing plants
are our clients**190+**

completed projects

Design, equipment supply, manufacturing of switchgear, construction and modernisation of industrial facilities, and process control systems. Our clients include enterprises in Ukraine, Kazakhstan, Romania, China and other countries.



Processing Plants

We build turnkey processing plants and modernise existing ones. For over 20 years we have been designing, manufacturing equipment and carrying out installation, commissioning and start-up — from technology development to bringing a plant to its design capacity.



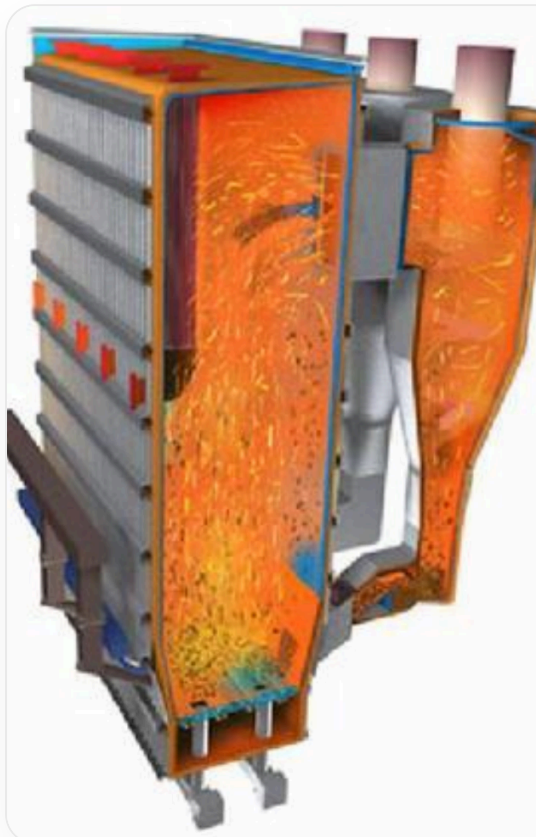
Production Lines

We design and supply complete production lines for processing a wide range of raw materials — ilmenite, manganese and iron ore, silica sand and powder, and hydraulic-fracturing sand. Crushing-and-screening, beneficiation, drying and filtration equipment: design, manufacturing, supply, installation and commissioning on a turnkey basis.



Modular Processing Plant

We supply modular processing plants with a capacity of 25 to 1200 t/h for beneficiation of run-of-mine coal of size class 0–100 (0–250) mm. A compact, quick-to-install solution with full control automation and the ability to scale up capacity.



Fluidised-Bed Furnace

Designed for intensive combustion of various coal grades of 0–10 mm fraction (slack, flotation tailings) with an ash content of 30 to 50 %, up to a maximum of 70 %. Heat release — up to 10 Gcal/m² of furnace area. Advantages: compact size compared with analogues; no readjustment needed when switching coal grade; operates without fuel-oil or gas support firing; no pre-grinding or emulsification of coal required. Fully automatic control — ignition, holding the set temperature and shutdown. Can also burn flotation and coal-industry waste, as well as household refuse. We provide manufacturing, supply, installation, commissioning and start-up.



Specialised Process Complexes

We develop and deliver specialised process complexes for mining, mineral-processing and beneficiation enterprises — tailored to the production specifics and the customer's requirements. We perform the full cycle: design, equipment selection and supply, automation, construction-and-installation and commissioning works, and start-up. We create both individual process sections and complete lines for processing coal, salt, crushed stone, ore and non-metallic materials, silica sand, limestone and clay. Each complex is engineered individually — to suit the raw material, required capacity and operating conditions.



We design and implement automated process control systems of any complexity — bringing all information to the plant dispatcher in a single supervisory control system. Over 100 automation systems have been developed and implemented.

Wagon Marking System

Marks coal (the processed material) with paint or solution to prevent cargo theft when open wagons stop at unguarded stations. The solution is prepared automatically to a set 'recipe'; application is in automatic, remote or local mode, and operation at sub-zero temperatures is possible.

Wagon Tippler & Pusher Automation

Automatic, remote or local control of the wagon tippler and pusher with contactless smooth speed regulation and motion reversal. The system monitors the distance between the train and the pusher, selects the coupling speed and provides emergency protection.

Automatic Solution Preparation

Prepares coagulant, flocculant or dye solutions to an operator-set concentration, reporting tank filling and component consumption. Performs automatic dosing depending on overflow density, pipeline flushing and mixing-speed control.

Flotation & Filtration Section Automation

Automatic monitoring of disturbing and control parameters and stabilisation of the flotation process using the AKPPF pulp-preparation complex. It monitors feed-pulp density and flow, solids quantity and flotation-tailings ash content, and stabilises the pulp level in the flotation machine.

Blast-Furnace Charge-Feed Control

Controls the blast-furnace charging equipment: contactless level monitoring of coke, pellets and additives in bins, and feeding of components into the skip to a set recipe. Provides weighing and automatic charge composition based on the feedstock.

Sludge-Pond Re-beneficiation

Control of a plant for re-beneficiating sludge-pond slurries, with monitoring and accounting of incoming feed and waste. Includes supervisory dispatch control and local automatic monitoring systems per the process flow of the plant or dredger.

Coke-Quenching Pump Control

Controls the water pump for pulsed coke quenching to a set programme — up to 10 steps, step time up to 999 s. Time and motor speed are set from a touch screen; supports motors from 0.25 kW to 1.2 MW.

Crushing & Screening Complex

Automatic, remote or local control of preliminary and final crushing with sizing into classes and grades. Maintains the optimal load on the crusher, detects and removes metal from the flow, distributes product across screens and optimises power consumption.

Pulsed Pneumatic Bin De-arching

Breaks down deposits and hang-ups of bulk materials (coal, rock, cement, grain) in bins in automatic, remote or local mode. Runs on compressed air or inert gas, requires no boiler-supervision registration, and the pneumatic-pulse power is adjustable.

Water-and-Sludge Circuit Automation

Control of the plant's water-and-sludge circuit with visualisation for the dispatcher: monitoring of pulp, suspension and recycled-water density, pipeline flows and waste ash content. Controls thickeners and clarifiers per the technical specification.

Mining Combine Sludge Facility

Automatic control of a mining-and-processing combine's sludge-facility shop and its pumping station: maintaining pulp level in sumps, monitoring density and pressure in pressure slurry pipelines. Automatically closes the knife gates in emergencies and monitors bearing temperature.

Plant Supervisory Dispatch Control

A single supervisory dispatch control system for the plant's equipment: automatic start-up of the conveyor-transport system and control of all local complexes — coal preparation, dense media, jigging, flotation and filtration, water-and-sludge circuit, and shipping. Provides warning and emergency alarms.

Jigging Complex Control

Automatic control of the gravity jigging process for any type of jigging machine, increasing process and economic efficiency. Monitors and stabilises the bed level and looseness, optimises throughput and controls the under-screen water.

Coal Intake, Preparation & Loading

Control of unloading, preparation for processing and loading of raw material: wagon tippler, dosers, feeders, conveyors, samplers. Performs contactless level monitoring in bins, automatic charge composition, weighing, power metering and soft-start of equipment.

Dense-Media Suspension Density Control

Automatic monitoring and maintenance of suspension density in dense-media separators and cyclones, and control of the dense-media beneficiation complex. Stabilises the set density of conditioned suspension and levels in tanks, and reduces sliming and viscosity.

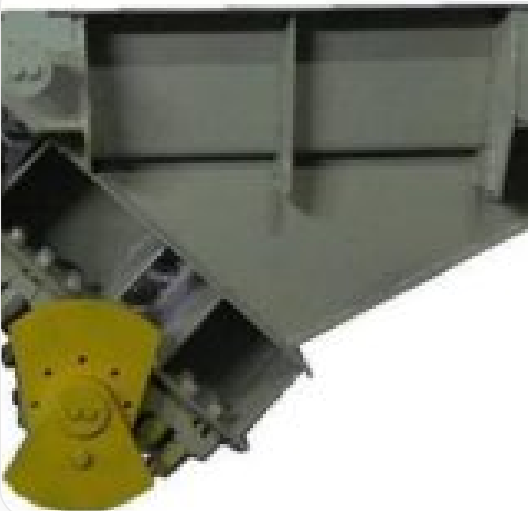
Thickener & Clarifier Monitoring

Automatic monitoring of thickener (clarifier) parameters and control of the thickening process: coagulant dosing and discharge of thickened product. Monitors the density of feed pulp, overflow and thickened product, the phase-separation level and reagent consumption.



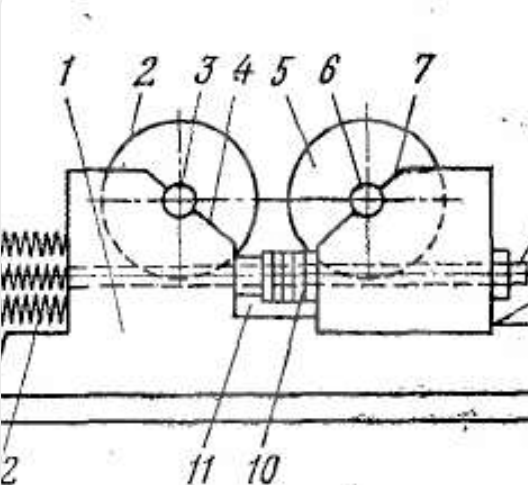
Screens

Inertial and vibrating screens and fine-classification screens are designed for sizing bulk materials into size classes. They are used at all stages of beneficiation — from preliminary screening of run-of-mine coal and ore to fine classification and concentrate dewatering.



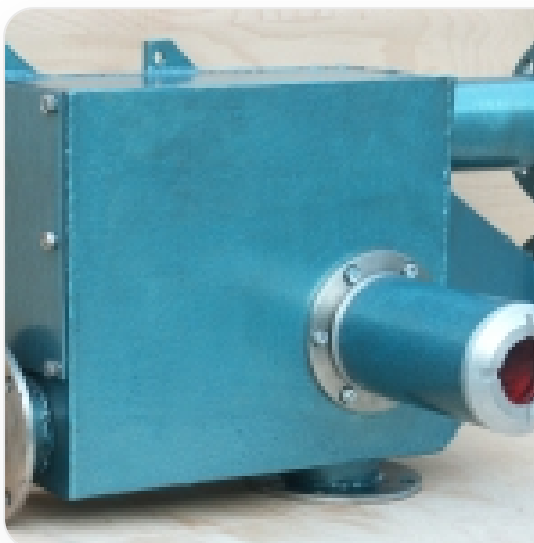
Feeders & Dosers

Scraper, drum and reciprocating feeders and dosers provide uniform, accurate feeding of bulk materials into the process. They stabilise the load on the equipment and maintain the plant's set throughput.



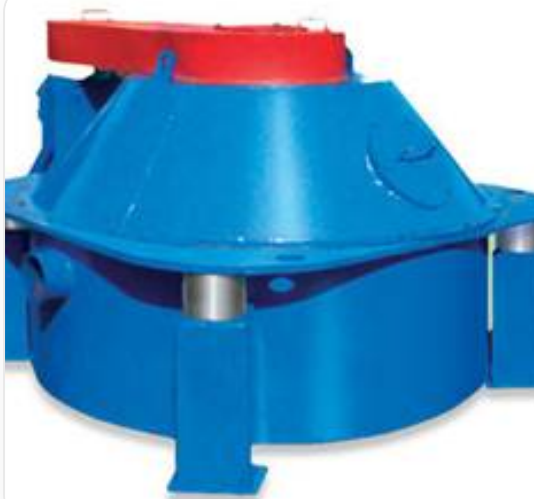
Crushing Equipment

Roll, jaw, impact and hammer crushers, as well as mills, are designed for crushing and grinding coal, ore and other minerals. They are selected for the required product size and throughput — from coarse crushing to fine grinding.



Ash-Content Control

Radioisotope ash meters for automatic continuous ash-content monitoring: of feed pulp, flotation tailings and coal concentrate shipped to the consumer. The sensor is installed on rising and falling flows, on pressure and gravity pipeline sections; measurement error up to 2 %. The system measures the concentrate's ash and moisture content on the conveyor belt, keeps records and a coal-quality database, and transmits data to the plant's control system or upper-level SCADA.



Centrifuges

Filtering vertical screw centrifuges are designed for dewatering concentrates, middlings and slurries. They deliver low product moisture with high throughput and reliable continuous operation.



Jigging Machines

MO and MOD series jigging machines of all sizes are used for gravity beneficiation of coal and ore by jigging. We manufacture and supply machines and spare parts and provide technical and process maintenance.



Separators

Magnetic, electromagnetic and high-gradient separators are designed for recovering magnetic fractions and beneficiating minerals. They are used for dry and wet magnetic beneficiation of ores and recovery of valuable components.



Flotation Machines

SF-series flotation machines are designed for beneficiation of minerals by flotation, including fine coal classes and non-ferrous metal ores. They provide high separation efficiency with economical reagent consumption.



Pumping Equipment

Slurry, submersible, end-suction and gravel pumps are designed for pumping pulps, slurries, suspensions and hydraulic mixtures with a high solids content. They are selected for flow, head and abrasiveness of the medium, with a wear-resistant flow path.



Iron Separators

EP and EPS series electromagnetic iron separators are designed for removing ferromagnetic objects from conveyed bulk material. They protect crushers, mills and conveyors from damage and increase line reliability.



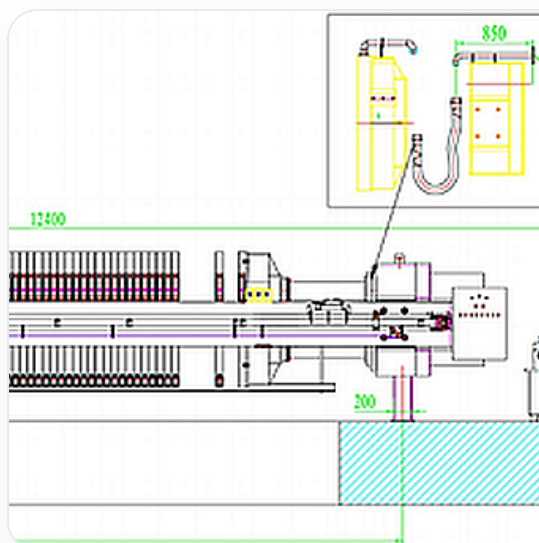
Drying Equipment

Three-drum drying units are designed for drying bulk materials — coal, concentrates, slurries and other beneficiation products. They ensure the specified residual moisture with high throughput and uniform drying.



Drilling-Mud Recirculation System

Drilling-mud cleaning and reuse units provide multi-stage removal of cuttings and return of the mud to circulation. They reduce reagent and water consumption and cut waste volumes and drilling costs.



Filtration Equipment

Chamber and membrane filter presses, as well as disc vacuum filters, are designed for dewatering concentrates, slurries and flotation tailings. They deliver low cake moisture and a clean filtrate at high throughput.



Solution Preparation Station

Reagent-solution preparation stations provide automatic preparation and dosing of flocculants, coagulants and other reagents at a set concentration. Stainless-steel body, touch-panel control and connection to the plant's control system.



Concentration Tables

We manufacture concentration tables with an inertial vibrator and a polyurethane-coated deck for gravity separation of granular materials in water by density — in beneficiation of non-ferrous, ferrous, rare and precious metal ores. Range: laboratory finishing SK-0.5, KS-1.2 (0.1–1.0 t/h), KS-2.6 (0.9–2.8 t/h) and SK-4 (1.0–5.0 t/h), material size 0.05–3 mm. Deck, launders and feed hopper are stainless steel; deck stroke frequency is adjustable via a variable-frequency drive.



Classifiers & Prospecting Devices

1KSN spiral classifiers are designed for washing, gravity separation of ground material into sand and slime fractions, and dewatering of beneficiation products. They are used in beneficiation of non-ferrous and ferrous metal ores, minerals and construction materials; overflow is through the rear wall. The spiral is lined with polyurethane pads, increasing wear resistance and service life. Model range for the required capacity: 1KSN6×6 — sands 6–8 t/h, spiral diameter 580 mm, pitch 250 mm; 1KSN7.5×6 — 7–10 t/h, diameter 600 mm, pitch 300 mm; 1KSN10×6 — 8–20 t/h, spiral diameter 980 mm, pitch 360 mm, trough length up to 7000 mm. Units come with a manual spiral-lift winch and a 5.5 kW motor. We also manufacture washing devices for prospecting and mining operations.



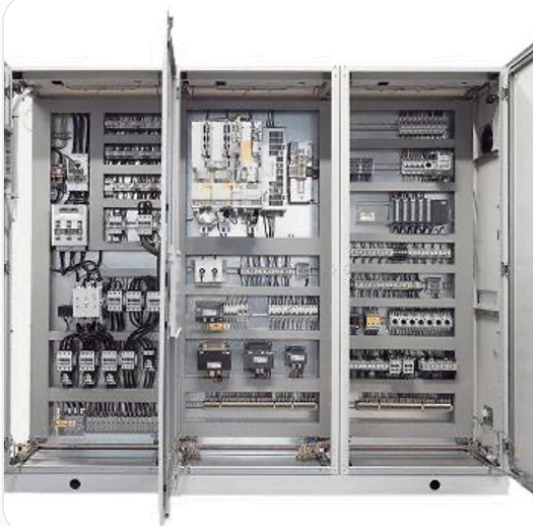
Schneider Electric

Official partner of Schneider Electric. We supply electrical equipment for industrial, commercial and infrastructure facilities: variable-frequency drives, soft starters, circuit breakers, contactors, PLCs and electric-drive control systems. Selected for motor power and automation requirements.



Danfoss

Danfoss drive technology: variable-frequency drives and soft starters for pumping, ventilation and production systems. They provide smooth motor starting, reduced inrush currents, energy savings and equipment protection against overloads.



Switchgear Equipment

We design, manufacture, install and commission switchgear equipment for industry, power engineering and utilities: distribution and power boards, main distribution boards, ATS and motor-control cabinets, and cabinets for pumping stations, ventilation and process control. Components by Siemens, Schneider Electric, Danfoss; assembled and tested before shipment.

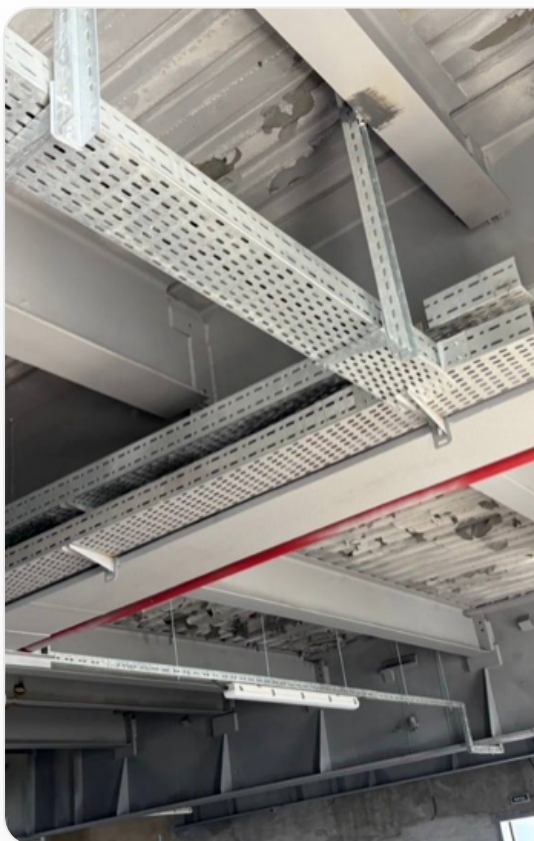
Design & Turnkey Works

Full cycle: design, installation, commissioning, service



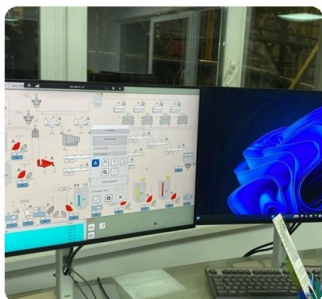
Design & Engineering

We design processing plants and industrial facilities — from the 'Design' stage to the 'Detailed Design', including state expert review. We develop process solutions, power supply, control systems, and design and working documentation. Projects delivered for plants in Ukraine, Kazakhstan, Romania and other countries.



Turnkey Works, Installation & Service

We perform the full scope of works: installation, supervised installation, commissioning, maintenance and repair of process equipment and automation systems. We provide service support at every stage — from start-up to operation of the equipment at the customer's site.

**195+**

completed projects

50+

client enterprises

4

countries of operation

Areas of Completed Work

Turnkey construction of processing plants and units

Design of industrial facilities

Automation of any technological processes

Pulsed pneumatic bin de-arching

Dense-media beneficiation

Jigging-machine automation

Flotation automation

Filter-press section and radial-thickener section

Control systems for sludge re-beneficiation units

Cyclone-battery control

Feedstock and waste accounting

Power-equipment control systems

Soft start, dosing and control

Installation, commissioning and service

Pulsed Pneumatic Bin De-arching

10

- ◆ Kalininska CPP — 6 run-of-mine coal bins
- ◆ Kalininska CPP — wagon-tippler pits
- ◆ Uzlovskaya CPP — 3 run-of-mine coal silos
- ◆ Chumakivskaya CPP — 5 concentrate loading bins, including 0–0.5 mm flotation concentrate at 20% moisture
- ◆ Pavlohradskaya CPP — 10 run-of-mine coal bins
- ◆ Dobropilskaya CPP — 10 bins
- ◆ Dobropilskaya CPP — wagon-tippler pits
- ◆ Komsomolskaya CPP — 2 bins
- ◆ Komsomolskaya CPP — 2 silos
- ◆ Pavlohradskaya CPP — RU-PO-120 air-cannon working unit with electric drive

Dense-Media Beneficiation

13

- ◆ Pavlohradskaya CPP — dense-media beneficiation system
- ◆ Dymytrivskaya processing unit — VKV-20, GT-710
- ◆ Chumakivskaya CPP — STK-12
- ◆ Rover LLC — SKV-20
- ◆ Sputnik PP — SKVP-32
- ◆ Shestaki Open Pit LLC — drum separator for Barzasske Tovarystvo LLC
- ◆ dense-media beneficiation systems
- ◆ Yasynivskaya PP — dense-media complex
- ◆ Postnykivskaya PP — GT-710
- ◆ Mospyne CPE — dense-media complex
- ◆ Sverdlovskaya CPP — dense-media complex
- ◆ Oktyabrskaya CPP — DMC control cabinet
- ◆ EAST WEST HOLDING LIMITED, China — Kazakhstan — power-equipment control system in a dense-media cyclone circuit

Dense-Media Beneficiation (continued)

2

- ◆ Myrnohradskaya CPP — control system for an OM-type jigging machine and a dense-media separator
- ◆ Velet LLP, Kazakhstan — TSGTs-630-MPK dense-media cyclone complete with assembly units and flow-path lining

Jigging-Machine Automation

5

- ◆ Ukraina CPP — automatic jigging-machine control system with process commissioning
- ◆ Rossiya CPP — automatic jigging-machine control system with process commissioning
- ◆ Krasnaya Zvezda GPP — OM-24, automatic jigging-machine control system with automatic bed-looseness maintenance, 3 compartments, with process commissioning
- ◆ Makiivka Coke Plant, CPS-2 — OM-18 for fine grain, 3 compartments. Automatic jigging-machine control system with automatic bed-looseness maintenance and process commissioning
- ◆ Makiivka Coke Plant, CPS-2 — OM-12, 2 coarse-grain compartments. Automatic jigging-machine control system with automatic bed-looseness maintenance and process commissioning

**Jigging-Machine Automation
(continued)**

5

- ◆ Chumakivska CPP — OM-18, automatic jigging-machine control system with automatic bed-looseness maintenance, check machine for 3 compartments, with process commissioning
- ◆ Mospynska CPP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning
- ◆ Pavlohradska CPP — OM-24, automatic jigging-machine control system with automatic bed-looseness maintenance, 3 compartments, with process commissioning
- ◆ Postnykivska PP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning
- ◆ Donetsk CPP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning

**Jigging-Machine Automation
(continued)**

5

- ◆ Krasnoluchska PP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning
- ◆ Avdiivka Coke Plant, CPS-1 — automatic control system for jigging machine OM-18/3 No. 1 with automatic bed-looseness maintenance and process commissioning
- ◆ Kolosnykivska CPP — automatic control system for jigging machine MO-318 with automatic bed-looseness maintenance and process commissioning
- ◆ Kurakhivska CPP — automatic control system for jigging machine OM-12 with automatic bed-looseness maintenance and process commissioning
- ◆ PP '105' — automatic control system for jigging machine OM-12 with automatic bed-looseness maintenance and process commissioning

**Jigging-Machine Automation
(continued)**

5

- ◆ Uglegorska PP — automatic control system for discharge of the rock bed of jigging machine OM-18
- ◆ Koksova PP — technical audit of a new jigging machine installed at the plant, repair and process commissioning
- ◆ Izvestiya GPP — automatic jigging-machine control system with automatic bed-looseness maintenance
- ◆ Dobropilska CPP — 'Eksim' automatic jigging-machine control system, section No. 2, OM-18/3 coarse grain, with automatic bed-looseness maintenance and process commissioning
- ◆ Avdiivka Coke Plant, CPS-1 — automatic control system for jigging machine OM-18/3 No. 2 with automatic bed-looseness maintenance and process commissioning

Jigging-Machine Automation (continued)

4

- ◆ Avdiivka Coke Plant, CPS-1 — automatic control system for jigging machine OM-18/3 No. 5 with automatic bed-looseness maintenance and transfer of all monitored data to the plant's control system. Process commissioning completed
- ◆ Vesti PP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning
- ◆ Uglegorska PP — OM-12, automatic jigging-machine control system with automatic bed-looseness maintenance, 2 compartments, with process commissioning
- ◆ Modernisation of a fine-grain OM-12 jigging machine to increase the gravity section's throughput. After modernisation the machine's throughput reached 300–350 t/h without degrading quality, within the set loss and contamination limits

Jigging-Machine Automation (continued)

4

- ◆ Dobropilska CPP — automatic control system for jigging machine OM, section No. 1, OM-18/3 coarse grain, with automatic bed-looseness maintenance and process commissioning
- ◆ Donetsk PP — technical audit of a jigging machine installed at the plant, repair and process commissioning to reach the required product-quality figures
- ◆ Sverdlovsk CPP — OM-24/3, modernisation of the existing jigging-machine control system and commissioning to reach the required product-quality figures
- ◆ Komendantska CPP — automatic control system for jigging machine OM, section No. 1, OM-24/1 coarse grain, with automatic bed-looseness maintenance and process commissioning

Jigging-Machine Automation (continued)

5

- ◆ Obukhivska CPP — a set of process-automation hardware (KMS control system) per TU 4252-001-22219578, control system for jigging machine MO-318. Control of discharge, looseness and elevators
- ◆ PJSC 'Krasnaya Zvezda GPP' — jigging-machine automation system: repair and start-up of the power section
- ◆ Selydivska CPP — system for stabilising and regulating the rock-layer level and material-bed looseness for jigging machine OM-18
- ◆ Dobropilska CPP — modernisation of jigging-machine control cabinets
- ◆ Dobropilska CPP — overhaul of MO-318 jigging-machine control cabinets, including equipment supply, repair, commissioning and start-up

Jigging-Machine Automation (continued)

3

- ◆ Dobropilska CPP — replacement of components and units of the automated jigging control system, including supply of control-system equipment
- ◆ Yevrouksitigrin — MOD jigging-machine control panel
- ◆ Myrnohradska CPP — control system for an OM-type jigging machine and a dense-media separator

Flotation Automation

8

- ◆ Municipal processing unit — automatic flotation control system
- ◆ Kalininska CPP — automatic flotation control system
- ◆ Makiivka Coke Plant, CPS-2 — automatic control system for the flotation-and-filtration section
- ◆ Kolosnykivska CPP — automatic flotation control system
- ◆ Koksova PP — automatic flotation control system and control system for the flotation-feed cyclone battery
- ◆ Krasnohorska PP — automatic flotation control system
- ◆ Ziminka PP — automatic flotation control system and control system for the flotation-feed cyclone battery
- ◆ Komsomolska CPP — automatic flotation control system

Flotation Automation (continued)

3

- ◆ Avdiivka Coke Plant, CPS-1 — automatic flotation control system
- ◆ Avdiivka Coke Plant, CPS-1 — froth-paddle control system
- ◆ Dobropilska CPP — replacement of components and units of the automated flotation control system, including supply of control-system equipment

Filter-Press Section and Radial-Thickener Section

3

- ◆ Kalininska CPP — turnkey supply of a set of control systems, including power-equipment control cabinets and a dispatch control system, for the construction of a new filter-press section
- ◆ Avdiivka Coke Plant, CPS-1 — system for detecting the clarified-layer level in C-10 thickeners with automatic flocculant-doser control
- ◆ Avdiivka Coke Plant, CPS-1 — system for detecting the clarified-layer level in radial thickeners with peripheral drive and automatic flocculant-doser control

Filter-Press Section and Radial-Thickener Section (continued)

3

- ◆ Antratsyt GPP — turnkey supply of an automatic radial-thickener control system: automatic preparation and dosing of flocculant solution, automatic discharge of thickened product at a set density, automatic maintenance of the clarified-layer level and overflow density. In operation without issues
- ◆ Shakhtarska PP — turnkey supply of an automatic radial-thickener control system: automatic preparation and dosing of flocculant solution, automatic discharge of thickened product at a set density, automatic maintenance of the clarified-layer level and overflow density
- ◆ Kurakhivska CPP — control system for the filter-press section: from design to implementation

Filter-Press Section and Radial-Thickener Section (continued)

1

- ◆ Kurakhivska CPP — implementation of an automated radial-thickener control system, including equipment supply, installation, commissioning and start-up

Control Systems for Sludge-Pond Re-beneficiation Units

3

- ◆ Sludge-beneficiation unit, Romania — automatic start/stop control of the equipment chain, automatic control of the conveyor-transport and water-and-sludge circuit, dispatch control system, automated accounting of feed from the sludge pond, of waste discharged into the pond, and of the concentrate obtained
- ◆ SE 'Dzerzhynskenerhoresurs' — sludge-pond re-beneficiation unit. Control system repaired and the unit started in automatic mode. The unit had been supplied and commissioned by the Belgian company IPAS
- ◆ Pavlohradaska CPP — sludge-pond re-beneficiation unit installed in the plant's main building. Control system repaired and the unit started in automatic mode

Control Systems for Sludge-Pond Re-beneficiation Units (continued)

2

- ◆ Air-separator unit, Bilorichenska mine — turnkey supply of Ukrainian-made equipment-control cabinets: conveyors, screens, blowers and other equipment. Automatic, remote and local control implemented
- ◆ Avdiivka Coke Plant — control system for the washing, flotation and filter-press sections and the radial-thickener section

Cyclone-Battery Control

4

- ◆ Pavlohradaska PP — cyclone-battery control system at the sludge-pond beneficiation unit
- ◆ Koksova PP — cyclone-battery control system
- ◆ Ziminka PP — cyclone-battery control system
- ◆ EAST WEST HOLDING LIMITED, China — Kazakhstan — dense-media cyclone power-equipment control system

Feedstock and Waste Accounting

6

- ◆ Komsomolska CPP — sludge re-beneficiation unit. Automated feedstock accounting and feed-density measurement on the dredger
- ◆ 'Ekoteh' subsidiary — sludge re-beneficiation unit. Automated flotation-feed density measurement
- ◆ Donuglekon — sludge re-beneficiation unit. Automated feedstock accounting and feed-density measurement on the dredger
- ◆ Pavlohradskaya CPP — sludge re-beneficiation unit. Cyclone-battery control system
- ◆ Uzlovka CPP — sludge re-beneficiation unit. Automated feedstock accounting
- ◆ Pavlohradskaya CPP — system for accounting beneficiation waste discharged into the sludge pond, with measurement of the average ash content of particles in the pulp

Feedstock and Waste Accounting (continued)

4

- ◆ Mospyne CPE — automatic system for accounting waste discharged into the sludge pond, with measurement of the average ash content of particles in the pulp
- ◆ Koksova PP — automatic system for accounting waste discharged into the sludge pond, with measurement of the average ash content of particles in the pulp
- ◆ Ziminka PP — automatic system for accounting waste discharged into the sludge pond, with measurement of the average ash content of particles in the pulp
- ◆ Bilorichenska PP — automatic system for accounting waste discharged into the sludge pond, with measurement of the average ash content of particles in the pulp. Flow-through design, operating at 3 atm

Power-Equipment Control Systems

2

- ◆ DTEK Oktyabrskaya CPP — power cabinet
- ◆ Zakhidno-Donbaska PP — automated process control system for the main building of the 'PP ZD' branch

Soft Start, Dosing and Control

9

- ◆ Bryketa CPP — control of three dosers
- ◆ Uzlovskaya CPP — soft-start system for the 220 kW main conveyor, including under load
- ◆ Uzlovskaya CPP — control system for five feeders
- ◆ Kalininska CPP — feed control system for three drying units
- ◆ Altkom Brick Plant LLC — control system for a 300 kW extruder
- ◆ Motor Sich JSC — two systems for automatic speed-holding of a grinding-machine drive shaft
- ◆ Motor Sich JSC — automatic pressure-holding system in the process-water pipeline
- ◆ Makiivka Coke Plant — two automated coke-quenching systems
- ◆ CGOK — 12 electromechanical DN 800 gate valves with an automatic control system. Work performed jointly with Vostokuglemash LLC

**Soft Start, Dosing and Control
(continued)**

7

- ◆ Barakov Mine — control system for a GTsL-2 screen. Work performed jointly with Vostokuglemash LLC
- ◆ Donstroyromontazh — 1ShchSU-K control cabinet and AO-2 input panel for two centrifuges
- ◆ Kurakhivska CPP — re-equipment of the main-building distribution point, board IIIV, stage one, including equipment supply, installation, commissioning and start-up
- ◆ Zakhidno-Donbaska PP — automated process control system for the main building of the 'PP ZD' branch
- ◆ Karpatska Ore Company PrJSC — tank-level maintenance system
- ◆ TSGTs-630-MPK dense-media cyclone complete with assembly units and flow-path lining — Velet LLP, Kazakhstan
- ◆ Upper- and lower-overflow tanks with lining — Velet LLP, Kazakhstan

**Soft Start, Dosing and Control
(continued)**

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- ◆ Flotation-tailings ash indicators — DMZ, Svyato-Varvynska plant, Engineering Technological Union, Dobropilska CPP, Nikoprohresstroy
- ◆ Flow divider — DTEK Oktyabrskaya CPP
- ◆ Dense-media suspension density indicator — DTEK Oktyabrskaya CPP, Zakhidno-Donbaska PP
- ◆ Density meter — DTEK Pavlohraduhil, Zakhidno-Donbaska PP
- ◆ Feed flowmeter — Zakhidno-Donbaska PP
- ◆ DN 150 and DN 300 gate valves — Dobropilska CPP
- ◆ Flowmeter-tank sensor — Dobropilska CPP
- ◆ Flotation, jigging and under-screen water density indicators — Dobropilska CPP, Zakhidno-Donbaska PP
- ◆ Level sensors — Dobropilska CPP, Selydivska CPP, Myrnohradskaya CPP, Zakhidno-Donbaska PP
- ◆ Reagent divider — Dobropilska CPP

**Soft Start, Dosing and Control
(continued)**

4

- ◆ Device for monitoring and automatic maintenance of a set density — EAST WEST HOLDING LIMITED, China — Kazakhstan
- ◆ Rotary valve — Kurakhivska CPP
- ◆ Torque sensor — Kurakhivska CPP
- ◆ BPS-36-10V signal-conversion unit — DTEK Pavlohraduhil

Design & Engineering

7

- ◆ Power supply and control system for a sludge-beneficiation unit, Romania
- ◆ Control system for the Novovolynska processing plant
- ◆ Control system for the Obukhivska processing plant
- ◆ Power supply and control system for the filter-press section of the Kalinivska processing plant
- ◆ Power and electricity supply and control system for the Yasinivska processing plant
- ◆ Enterprise and equipment power supply, and control system for a new processing plant at the Bilorichenska mine
- ◆ Control system for CPS-1 of the Avdiivka Coke Plant. A project was developed to modernise the automatic control systems and create an upper-level control system

Design & Engineering (continued)

5

- ◆ Automation project for dense-media separators and jigging machines at Komendantska CPP
- ◆ Equipment power supply and control system for the new Shakhtarska processing plant
- ◆ Control system for dense-media separators. Modernisation of Oktyabrskaya CPP: replacing a jigging machine with a dense-media cyclone complex
- ◆ Detailed design 'Reconstruction of the coal-slurry hydro-classification and screw-separation waste dewatering unit in the main building of the Pavlohradskaya CPP branch, DTEK Pavlohraduhil PJSC'
- ◆ Feasibility study for the detailed design 'Re-equipment of the water-and-sludge circuit at DTEK Oktyabrskaya CPP PJSC'

Design & Engineering (continued)

5

- ◆ Control-system project and re-equipment of run-of-mine ore crushing lines at CGOK
- ◆ Detailed design 'Development and justification of optimal slope parameters for the Eastern section of the NTRU Limestone Quarry under specific mining-technical and geological conditions'
- ◆ Detailed design 'Development and justification of optimal slope-structure parameters for the Western section of the NTRU Limestone Quarry'
- ◆ Detailed design 'Development and justification of optimal slope-structure parameters for the Western section of the NTRU Limestone Quarry'
- ◆ Development of the electrical part of the design documentation 'Reconstruction. Installation of a pneumatic de-arching system for a MERZ-type furnace at the Illich Mariupol Metallurgical Combine PJSC'

Design & Engineering (continued)

4

- ◆ Detailed design 'Re-equipment of the beneficiation process flow of section No. 2 by introducing beneficiation of 1–13 mm run-of-mine coal in dense-media cyclones at DTEK Oktyabrskaya CPP PJSC'
- ◆ Detailed design 'Process automation and communication systems for the project — dewatering at the Vodyana-1 mine field to improve the ecological state of the Vodyana River, Dobropillia district, Donetsk region', DTEK Oktyabrskaya CPP
- ◆ Development of detailed design documentation, supply of a dewatering complex based on Phoenix belt filter presses and a control system for the project 'Introduction of a liquid-waste treatment and dewatering unit at CPP Kurakhivskaya LLC'
- ◆ Feasibility study for modernisation of the Alians Ugol processing plant, Kazakhstan

Design & Engineering (continued)

5

- ◆ Detailed-design project for modernisation of the Alians Ugol processing plant, Kazakhstan, by introducing a middlings-beneficiation complex in a dense-media cyclone
- ◆ Detailed-design project 'Enclosure of the feedstock coal-preparation complex and design of a run-of-mine coal supply gallery to the coal-preparation complex' for Alians Ugol LLC, Kazakhstan
- ◆ Development of detailed design documentation, installation of two Phoenix belt filter presses and implementation of a control system at Pavlohradskaya CPP
- ◆ Development of a technology for producing 'Extra'-grade salt from the feedstock of the Tereblya rock-salt deposit
- ◆ Detailed design 'Overhaul of the surface process complex of block No. 1, Zakhidno-Donbaska mine'

Installation, Commissioning, Supervised Installation and Service

6

- ◆ Sverdlovskaya CPP — maintenance and commissioning of the dense-media separation and jigging control system
- ◆ Sverdlovskaya CPP — maintenance of the KSGTs complex
- ◆ Sverdlovskaya CPP — supervised installation of the automatic control system for the dense-media cyclone block and the sludge-beneficiation block
- ◆ DTEK Kurakhivskaya CPP — maintenance and commissioning of the dense-media separation and jigging control system
- ◆ DTEK Kurakhivskaya CPP — servicing of the automatic control system of the sludge-pond cleaning unit
- ◆ DTEK Kurakhivskaya CPP — maintenance of the automatic control system for jigging machine MO-312 and the dense-media separator control system

Design & Engineering (continued)

5

- ◆ Detailed design for the construction of a 180 t/h processing plant with middlings extraction, Kazakhstan
- ◆ Detailed design for a modular processing unit of block No. 1, Zakhidno-Donbaska mine, Ternivske Mine Administration, DTEK Pavlohraduhil
- ◆ Development of automation and process-control design documentation for the detailed design 'New construction of a purchased-coal warehouse, Zakhidno-Donbaska Processing Plant branch, DTEK Pavlohraduhil PrJSC'
- ◆ Technological audit of plant operation
- ◆ Donetskaya CPP, '105' CPP, Mospyne CPE, Kolosnykivskaya CPP, Prokopivskaya PP, Oktyabrskaya CPP, Sverdlovskaya CPP, Alians Ugol, Kazakhstan

Installation, Commissioning, Supervised Installation and Service (continued)

8

- ◆ DTEK Kurakhivska CPP — servicing of the control system and switchgear of boards No. 3 and No. 4 of the main-building machinery
- ◆ Dobropilska CPP — jigging-machine maintenance
- ◆ Dobropilska CPP — equipment maintenance
- ◆ Dobropilska CPP — flotation-equipment maintenance
- ◆ Dobropilska CPP — repair and installation to replace components and units of the automated jigging-control system
- ◆ Dobropilska CPP — modernisation of jigging-machine control cabinets
- ◆ Avdiivka Coke Plant — maintenance of the automation systems of the CPS-1 washing and flotation sections
- ◆ DTEK Oktyabrskaya CPP — replacement of the control board of the OGSh-462L-01 UHL4 centrifuge unit

Installation, Commissioning, Supervised Installation and Service (continued)

8

- ◆ Sverdlovskaya CPP — commissioning of the automatic control system for the dense-media cyclone block and the sludge-beneficiation block
- ◆ Komsomolets Donbasa — commissioning of the thickening-section distribution point
- ◆ Sverdlovskaya CPP — maintenance and commissioning of the process control system for dense-media separation and jigging
- ◆ Dobropilska CPP — installation and commissioning within the project
- ◆ DTEK Kurakhivska CPP — commissioning works for the project
- ◆ DTEK Kurakhivska CPP — installation works for the project
- ◆ Kurakhivska — creation of a control system for the filter-press section: from design to implementation
- ◆ Lviv Coal Company — process commissioning of a jigging-machine control system

Installation, Commissioning, Supervised Installation and Service (continued)

8

- ◆ Oktyabrskaya CPP — repair of variable-frequency drives
- ◆ Oktyabrskaya CPP — repair of the main and auxiliary fans and the main power supply of the VFD control circuits
- ◆ MIKA Weighing Company — installation of ErMak VL1×2×4 conveyor scales
- ◆ Svyato-Varvarynska — diagnostics and repair of flotation-tailings ash indicators
- ◆ Doninteruhol — diagnostics, repair and commissioning of a jigging-machine control system
- ◆ Dobropilska CPP — overhaul of MO-318 jigging-machine control cabinets
- ◆ Installation, supervised installation and commissioning
- ◆ Sverdlovskaya CPP — installation of the automatic control system for the dense-media cyclone block and the sludge-beneficiation block

**Installation, Commissioning,
Supervised Installation and Service
(continued)****6**

- ◆ Oktyabrskaya CPP — commissioning of a centrifuge control system
- ◆ Pavlohradskaya CPP — installation of two PHOENIX WX-3.0G-6 Belt Filter Press units (USA) with auxiliary equipment on axes K-0/7–10
- ◆ Selydivska CPP — supervised installation, commissioning, staff training and start-up of the automated system for stabilising and regulating the rock-layer level and bed looseness
- ◆ Dobropilska CPP — overhaul of MO-318 jigging-machine control cabinets, including equipment supply, repair, commissioning and start-up
- ◆ Koalenerji — commissioning of a jigging-machine automation system
- ◆ Turnkey processing-plant construction projects



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