



RESEARCH AND PRODUCTION HOLDING

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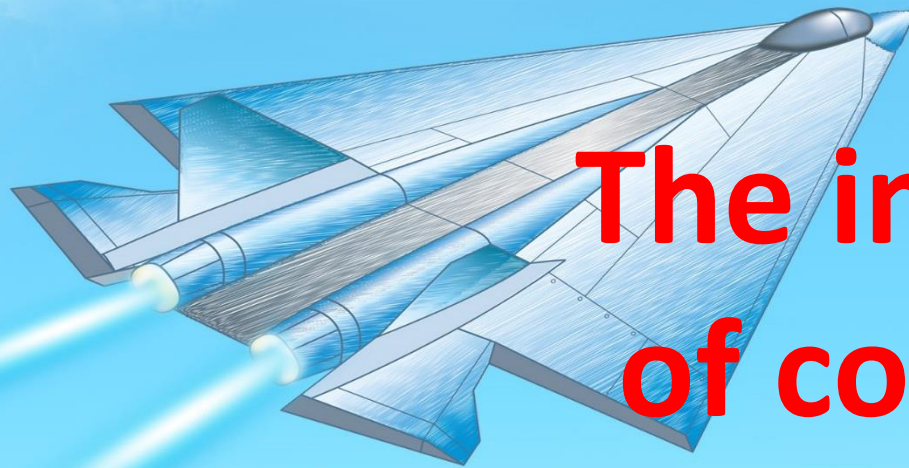
URAL ENGINEERING CENTER

Russia, Chelyabinsk  
reception: +7 351 7-753-753

<mailto:tec@cheltec.ru>

[www.cheltec.ru](http://www.cheltec.ru)

**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**



**The implementation  
of complex projects  
in the industry**





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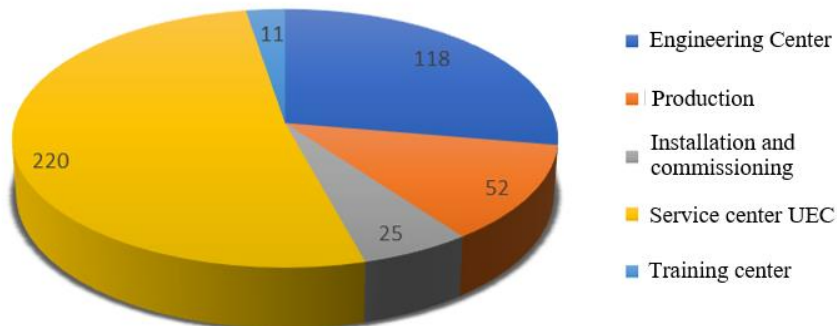
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

- **Technological units and complex lines**
- **Automated systems**
- **Testing complexes**
- **Electro-hydraulic systems**
  - **Design**
  - **Production**
  - **Installation and commissioning**
  - **Service**
  - **Repairs**
  - **Training**

Total 426 people, including representation in Moscow and Cherepovets



Holding company  
Ural Engineering Center



**Engineering Center**  
(design department, department of instrumentation and automation, department of the main electrician, department of the electric drive (high-voltage and low-voltage), laboratory of the electric drive and hydraulic drive)  
118 people



**Factory**  
52 people



**Installation and commissioning**  
25 people



**Service center**  
220 people



**The educational center**  
11 people



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**URAL ENGINEERING CENTER** is a managing company of the Research and Production Holding CHELTEC. Currently the holding is a group of companies that solves comprehensive tasks to create process equipment and production lines and integrates research and development, production, installation, service and training subdivisions.

Ural Engineering Center has its own production, research and development base in the city of Chelyabinsk. In addition, there are representative offices in Moscow and Cherepovets, as well as an enterprise for equipment servicing at Nizhny Tagil Metallurgical Plant.

The main competitive advantage of the holding is a high professional level of employees which can use an integrated approach to solve problems – manufacturing of turnkey complex process equipment, including engineering, software, production, installation, start-up, training and subsequent service support. We have obtained over 90 patents for the development of different units and assemblies.

The main strategic direction of growth is the development of radically new technologies and process modules for mining and smelting, military and industrial, machine-building complex, rail transportation, oil and gas, aviation, aerospace, and shipbuilding industry enterprises



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Principle of operation (full cycle services)

Problem designation

Making (agreement) of the technical assignment

Solution study

Development of design documentation

Production of non-standard equipment on the own production base

Hydraulic, mechanical equipment, electrical cabinets,  
control systems

Total production area is 8500 m<sup>2</sup>, warehouse - 1000 m<sup>2</sup>,  
cranes, welding machines, test benches, machinery and  
equipment (52 machines), 11 units of transport

Installation and startup in the production chain of the Customer

Training. Warranty and after-sales service





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Patents, certificates, licenses



We have obtained over 90 patents for the development of different units and assemblies.

Quality management system of Ural Engineering Center, LLC is certified and successfully applied in accordance with ISO 9001: 2015.

[TUV certificate of quality management system by ISO 9001:2015](#)



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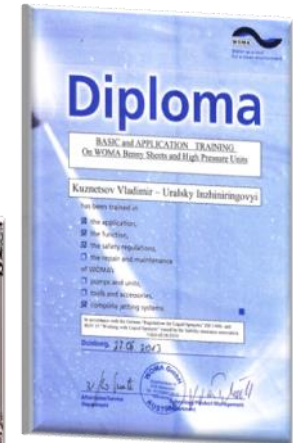
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Participation in exhibitions and contests





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Cheltec Partners



## REFERENCE LIST

### of Projects Developed and Implemented for the Period since 1995

- metallurgical complex: ferrous and non-ferrous metallurgy (rolling, pipe-rolling, ring-rolling, forging and pressing, steel-smelting, ore-thermal production)
- machine-building complex: mechanical engineering and metalworking (power engineering, metallurgical engineering, mining engineering, production of oil and gas production equipment, tractor construction)
- military-industrial complex: rocket and space, aviation industry, military shipbuilding
- fuel and energy complex: gas, oil industry, nuclear energy





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Trust us**







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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

**Metallurgical complex**

## Rolling



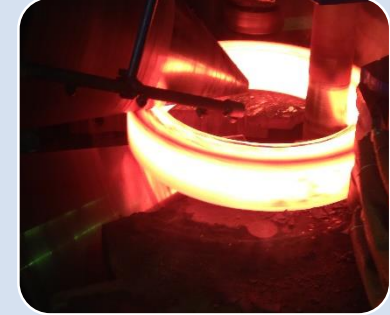
Sheet  
rolling



Shape and  
bar  
production



Pipe rolling



Ring rolling



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

Metallurgical complex

## Sheet rolling, shape and bar production



Overhaul and modernization of hot and cold rolling mill systems



Work rollers bending protection systems



Grease-and-oil systems



Systems for process fluid preparation and purification



Hydraulic descaling systems



Stands for assembly and disassembly of rolls



Installation and flushing of pipelines





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

Metallurgical complex

**Pipe rolling**



Complex reconstruction  
of pipe rolling



Pipe test benches



Mounting and  
flushing of pipelines



Modernization of molding  
press systems, cutting  
units



Hydraulic descaling  
systems



Modernization of  
forgeroller systems





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**Process units and complex lines**

Metallurgical complex

## Ring rolling



Ring rolling mill creation



In-depth modernization and commissioning of the manipulator



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

Metallurgical complex

## Creation of the ring rolling mill with radial and axial mills for finishing rolling of carbon and alloyed steel rings at Ruspolimet JSC (Kulebaki).



### Scope of work:

Design and manufacture of the axial mill;  
Design and manufacture of the new mill frame;  
Mathematical modeling and calculation of mill units;  
Reconstruction of the radial mill units:

- Installation of an independent drive of right and left centering rollers;
- Installation of the mandrel shaft rotation drive, mechanization of installation and removal of the mandrel shaft;
- Repair of mandrel shaft cartridges;
- Repair of the main shaft cartridge;



Design and manufacture of the new mill control system;  
Design and manufacture of the new hydraulic system of the mill;  
Design and manufacture of the new lubrication system for all components and units of the mill;

Design and manufacture of the cooling system for tools and equipment of axial and radial mills;

Design and manufacture of foundations for the mill, auxiliary facilities, cable routes and pipelines;

Restoration of the existing equipment of the J.BANNING radial mill;

**Design and manufacture of the manipulator for unloading finished rings.**







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**Process units and complex lines**

Metallurgical complex

## Steelmaking and ore thermal production complex capital and tenant improvements



Arc furnaces  
(6-120 tons)



Ladle furnaces  
(15-375 tons)



Continuous steel  
casting machines



Steel vacuum  
treatment installations



Ore thermal furnaces



Piping and mounting





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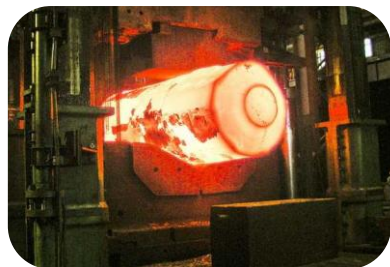
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**Process units and complex lines**

Metallurgical complex

**Non-ferrous metallurgy**  
complex capital and tenant improvements



Forging plants



Press-forging equipment



Rolling mills



Vacuum arc furnaces



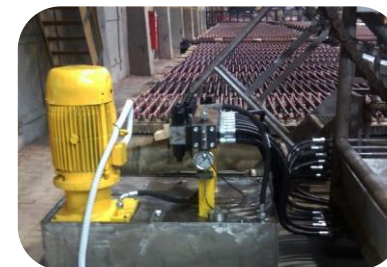
Units for rolling from molten condition



Mixer drives



Piping and mounting



Auxiliary equipment of production



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

**Metallurgical and machine-building complex**

**Forging**

complex capital and tenant improvements



Forging plants



Press-forging equipment



Manipulators



Press-rolling lines



Piping and mounting



Shut off control and distribution equipment of presses





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**Process units and complex lines**

Metallurgical and machine-building complex

**Example of using Rexroth equipment for a forging plant of a press 103 with a force of 30 MN. Customer VSMPO-Avisma (Verkhnyaya Salda)**



Pump control installation  
manufactured by Bosch-Rexroth





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Metallurgical and machine-building complex

**Example of using Rexroth equipment for a forging plant of a press 103 with a force of 30 MN. Customer VSMPO-Avisma (Verkhnyaya Salda)**



Hydropanel for control of shut-off control valves of the main hydraulic control valve



Hydropanel for control of guide valve



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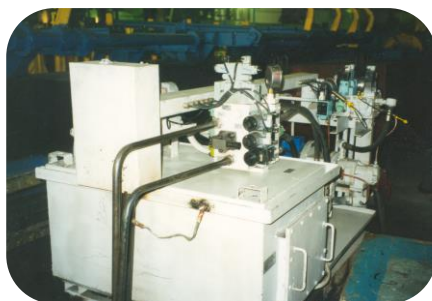
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

Metallurgical and machine-building complex

## Auxiliary mechanical equipment for production



Modernization of  
centerless lathes



Modernization of roll  
grinding machine



Overhaul of sheet  
shears



Hydraulic system of  
table-type scales



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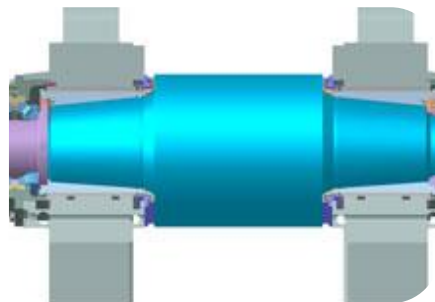
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

Metallurgical and machine-building complex

## Grease-and-oil systems, process fluid purification stations.



Installations for lubrication and cooling of bearings



Grease-and-oil systems of rolling mills



Multistage oil purification stations



Etching, flushing and pressure molding of pipelines of lubrication systems





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Process units and complex lines**

## Grease-and-oil systems, process fluid purification stations.

Example of work performed at Severstal PJSC (Cherepovets), 2017.

### Modernization of the lubrication system of OFB (oil film bearing) of the hot rolling mill 1700.

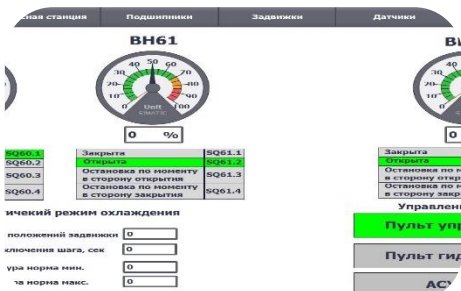
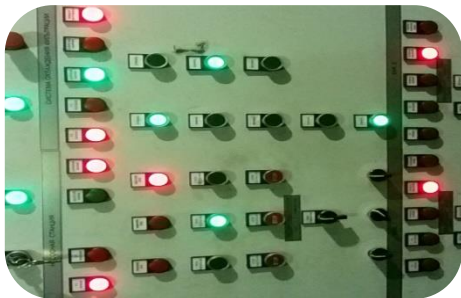
#### Objectives of modernization:

- increasing the production of hot-rolled strips in rolls by 5000 tpa
- ensure the stable operation of oil film bearings of the mills No.5, No.6 of the machine 1700 in all rolling modes
- reduce unplanned downtime
- reduce the cost of OFB revision
- increase the informativeness of the system
- replacement of an outdated control system

#### The upgraded lubrication system allowed to:

- ensure the supply of the required amount of oil to the mill bearings, without pressure drops;
- maintain a given level of oil pressure at the inlet to the mill bearings in all modes of operation of the mill;
- remotely relieve pressure at the inlet to the mill bearings during transshipments;
- maintain the set oil temperature at the inlet to the mill bearings;
- maintain the set temperature of oil in tanks of the lubrication system during downtime;
- detect the source of hydraulic oil watering;
- remotely monitor the operating parameters of each oil film bearing of the support rolls of mills No.5, 6;
- remotely monitor the operating parameters of the pump station of the lubrication system;

**Production of hot-rolled thin strip increased by 130 ktpa.**





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**Process units and complex lines**

Machine-building complex and RZD

### Machine-building complex



Overhaul and modernization of sheet bending machines



Hydraulic equipment of lining, trimming and leveling machines



Test bench for static test of rail cars



Electro-hydraulic control systems



Modernization of presses and forging complexes



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Process units and complex lines

Defense industry

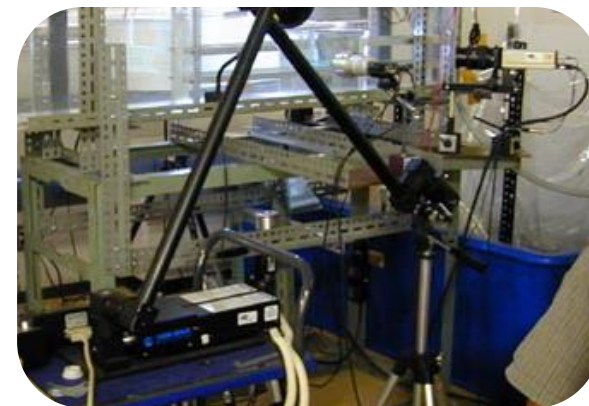
## Defense industry



Test benches



Press-forging  
equipment



Manufacturing pilot  
elements of fusion  
reactor





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**Process units and complex lines**

Defense industry

## Examples of the implementation of works for the defence industry

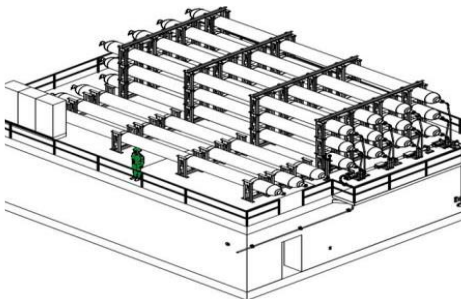


### **Universal three-axial servo-hydraulic shaker**

Customer: Ministry of Defense of the Russian Federation (GVSU No.9)  
for M.F. Reshetnev ISS JSC

### **Air supply system for acoustic reverberation chamber**

Customer: M.F. Reshetnev ISS JSC



**Test benches for endurance tests of the front and main landing gear legs of the TU-214 aircraft**

**Test benches for repeated static and endurance tests of landing gear legs of the IL-112V(T) aircraft**

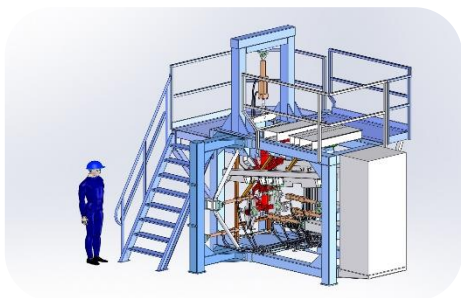
**Test benches for endurance tests of the main and tail landing gear legs of**

### **KA-62 helicopters**

Customer: Rostech State Corporation. Aviaagregat OJSC

### **Product test benches**

Customer: Proton-PM PJSC





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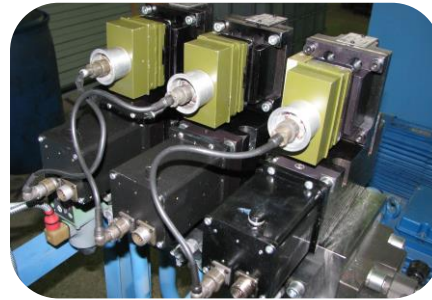
**Process units and complex lines**

Fuel and energy, oil and gas complex

## Fuel and energy, oil and gas complex



Test benches



Regulators for hydroelectric turbines of HPPs



Drilling rig moving and leveling system



Spinning wrench control system



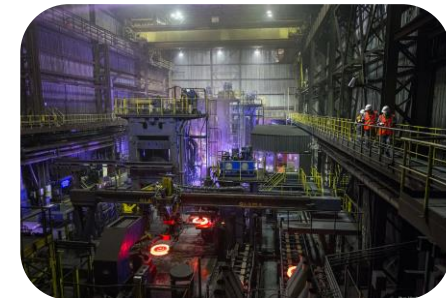
Steam generators for drilling rigs



Tests of towers (masts) of load-lifting units



Hydraulic drive (installation) for oil production



Heat supply systems for buildings





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Test facilities**

**Test facilities**

for metallurgical, machine-building plants, aircraft manufacturing, aerospace industry, defense and oil and gas industry, enterprises of RZD



Testing Center of  
TNN JSC



Tests of discrete and  
proportional equipment



Tests of pumps and  
hydromotors, accumulators



Tests of hydraulic  
cylinders



Tests of pipes and  
pipeline valves



Tests of towers (masts) of  
load-lifting units



Tests of oil submersible  
power cable





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**Test facilities**

for metallurgical, machine-building plants, aircraft manufacturing, aerospace industry, defense and oil and gas industry, enterprises of RZD

**Test facilities**



Cosmonauts training stand reversing drive



Aircraft and helicopter landing gear tests



Tests of cylinders



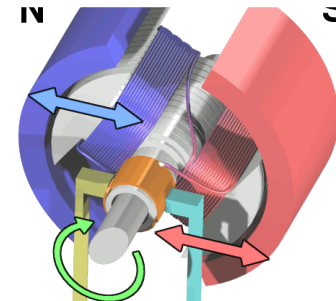
Static tests of rail cars



Overpressure testing of parts



Endurance tests of car racks



Pressure molding of stator cores



**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Test facilities**

**Test facilities**

**Example of the work performed at TNN JSC. Construction of a plant for the localization of the production of pumping equipment.**

Basic equipment:

- circulating water basin with a volume of 2615 m<sup>3</sup>;
- stationary booster pumps (2 pcs. x 4 MW + 1 pc. x 400 kW);
- pipeline system (including shut-off and control valves and flowmeters);
- sites with cast-iron plates (2x27 = 54 pcs.) with T-shaped grooves for fastening during testing of horizontal pumps;

Auxiliary equipment:

- water filtration system;
- system of gateways for testing vertical pumps at different immersion levels;
- cooling tower with heat sink capacity of up to 15 MW;
- three units for air cooling of antifreeze with a heat sink capacity of up to 1.5 MW;
- drainage system.

Technical characteristics of the test center:

The maximum flow rate of the tested pumps is 16000 m<sup>3</sup>/hour;

Maximum pressure:

- during main pumps testing - 7 MPa;
- during booster pumps testing - 1.6 MPa;
- during sectional pumps testing - 32 MPa;

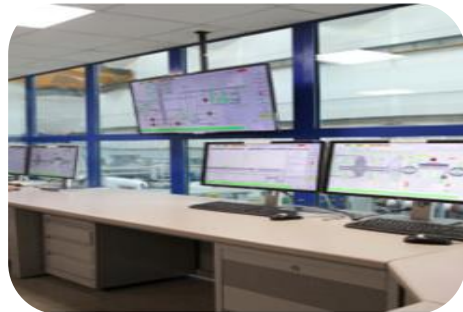
Maximum ED power of the tested pump is 12 MW;

Maximum diameter of pipelines is 1000 mm;

The test center includes: Secured voltage levels: 0.4 kV, 6 kV, 10 kV;

Estimated weight of the tested pump unit is 50 tons;

**Specialists of UrEC were involved at all stages of the project: from the formulation of the task and the formation of construction assignments to the complex commissioning of the facility.**





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

Serial production

## Serial products for hydraulic drives



Filters and cleaning systems



Reusable metal mesh filter elements



Hydraulic and pneumatic cylinders



Seals



HPH



Proportional distributors and servo valves





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

Serial production

**Innovative development**



Backhoe loader



Development of a new hydraulic drive for an oil production unit



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Services**

**Installation, etching, flushing and pressure molding of hydraulic equipment and pipeline systems**



heating furnaces



rolling mills



steelmaking complex  
(furnace, ladle furnace,  
vacuum vessel)



presses and forging  
complexes



mechanization for the  
Bolshoi Theater of Russia



RESEARCH AND PRODUCTION HOLDING

**CHELTEC**

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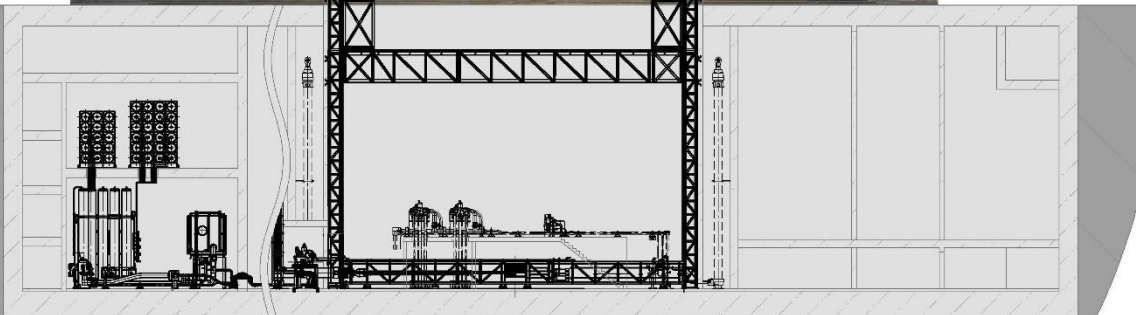
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### Installation and flushing of hydraulic equipment and pipeline systems.

Example of the performed work on pipe wiring and installation for the Bolshoi Theater of Russia (Moscow)



View from the depth of 20.7 m

#### Specifications:

Peak power output 2.7 MW;

Number of drive hydraulic cylinders 69 pcs.;

Design pressure 250 bar;

Maximum estimated

consumption

9,000 l/min;

Total volume of

piston batteries

13,000 liters;

Total volume of gas

cylinders 58,500 liters;

Hydrotank volume 50,000 liters.





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### **Installation and flushing of hydraulic equipment and pipeline systems.**

Bosch Rexroth AG was chosen as the general contractor for scenic equipment offering a globally unique project. As a result, the technical equipment of the new stage is not inferior to the status of the great Russian ballet



The subcontractor, Cheltec, completed the design, construction and installation of piping for the hydraulic system of stage mechanization.

More than 2,500 meters of pipelines with a diameter from 12 mm to 298 mm were installed and a 100% ultrasonic inspection of welds, pressure tests at 315 bar and final flushing of all hydraulic circuits were carried out



### Reference to Cheltec Work at the Bolshoi Theatre Project

Dear Ladies and Gentlemen!

Our company Bosch Rexroth AG maintains business relations with Ural Engineering Center (Cheltec), located in Chelyabinsk, Russia.

In 2011 Cheltec specialists participated in reconstruction and restoration of the Bolshoi Theatre in Moscow.

To manufacture and install a very complicated pipework for the hydraulic system, Rexroth needed a reliable partner in Russia. Cheltec became such a partner. As a subcontractor, Cheltec performed works on design, manufacture and installation of pipelines for the stage mechanization hydraulic system. Cheltec assembled 2,500 m of pipelines of 12 mm to 298 mm in diameter; all the pipelines up to 42 mm in diameter were assembled using weldless pipe coupling method. The installation procedure also included 100 % ultrasonic control of weld seams, 315 bar pressure tests and final flushing of all hydraulic system loops.

It should be noted that after two years of installation works in extreme dust and high humidity conditions, the flushing of pipelines took less than two weeks, which is the result of high quality and culture of works.

All non-standard items were manufactured at the Cheltec production site. Rexroth specialists repeatedly visited Cheltec site for products' quality approval and provided technical support in implementation of complicated technological solutions. It took Cheltec specialists jointly with Rexroth specialists two years to perform high-quality installation works in conditions of large-scale construction at the center of the Moscow city.

The teamwork showed high efficiency and drive for results from each of the specialists, thanks to which this huge amount of work consistently neared to its completion no matter what. And we managed to meet the deadline. It is a truly positive example of cooperation between the companies and specialists, and of human relations too.





Services

**Technological features:**



- large transmitted power resulting in significant pipe sizes (up to 298.5 x 32)
- pipelines bending and welding with continuous argon purging to prevent scaling of the inside surface of pipes and welds
- installation of pipelines up to  $\varnothing 42$  mm using VOSSFormSQR weldless technology
- additional low-noise requirements related to the acoustic requirements of the theater stage
- extremely limited installation space due to the architectural features of the historical part of Moscow
- large scope and high complexity of rigging
- constant supervision by supervisory authorities





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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

**Services**

**Service (creation of a service center)**

creation of service centers on the outsourcing principle since 2005



**MMK**  
(Magnitogorsk)



**ChTPZ**  
(Chelyabinsk)



**VMZ (Vyksa)**



**Betotek**  
(Chelyabinsk)



**RN-Purneftegaz**  
(Gubkinsky)



**Severstal**  
(Cherepovets)



**Rockwool-Ural**  
(Troitsk)



**YUUTEK**  
(Chelyabinsk)



**NTMK (Nizhny Tagil)**



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### Service (creation of a service center)

URITS NT was founded in 2013 with the aim of performing maintenance of equipment in the divisions of EVRAZ NTMK (Nizhny Tagil)

**Round-the-clock maintenance and repair of hydraulic systems and lubrication of the main workshops of EVRAZ NTMK**



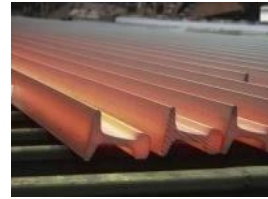
Blast furnace shop



Kolsnosortny workshop



Workshop rental wide beams



Rail and beam shop



Converter Shop





Wheel Binding Shop

An integrated approach to maintenance and repairs covers all types of work aimed at maintaining the equipment in working condition.

- ✓ equipment technical condition diagnostics
- ✓ maintenance
- ✓ current and capital repairs

- ✓ equipment upgrade
- ✓ timely supply of spare parts
- ✓ staff training to improve skills

- 
- reduced unplanned downtime
  - reduction in production losses

- 
- increase in operational life
  - increase in output



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### DCS design and manufacturing



- Development of the structure of control systems, selection of the element base (Siemens controllers (Logo, S7-200, S7-300, S7-400))
- Selection of electronic control system base (sensors, electric motors, relays, starters, automatic machines, etc.)
- Development of control algorithms and their implementation
- Project development management, controller programming
- Development of operational, technical and software documentation
- Development of visualization and archiving systems (based on WinCC, WinCC Flexible, Trace Mode, ProTool, RS View packages)
- Commissioning
- Failure diagnosis, selection of spare parts
- Training of personnel of the enterprise on work with equipment





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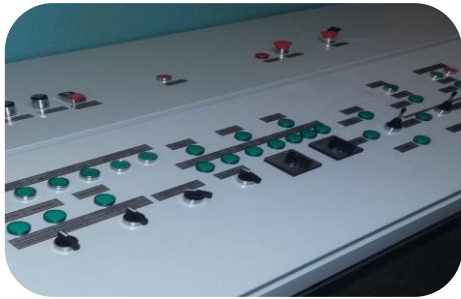
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

# Electrical equipment. Electric installation.



- Design of electrical networks up to 1000 V and above, automated control systems using components from well-known manufacturers (Schneider Electric, Siemens, ABB, DKC, Phoenix Contact, Omron)
- Manufacturing and assembly of low-voltage complete devices (cabinets, consoles, terminal boxes, etc.).
- Installation of equipment at the customer's site, subsequent commissioning and turnkey delivery
- Electromeasuring laboratory services
- Staff training



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### **Selection and delivery of standard equipment of Russian and foreign manufacturers**



- Complex supply of equipment, individual assemblies, components and spare parts
- Technical consultation, recommendations
- Direct established contacts with leading manufacturers of hydraulic equipment, electronic equipment in Russia, CIS countries, as well as in Germany, Japan, Bulgaria, China
- Import substitution
- Selection of analogues





Services

## Repair and testing of cylinders

- UrEC performs repair of hydraulic and pneumatic cylinders of any complexity.
- Production capacities of the workshop allow honed finishing of the liner, overlaying of bronze on the piston, manufacturing of various guide bushings, chrome plating of the rod surface, manufacturing of a set of seals for repair size.
- A separate test site is equipped with a bench for carrying out acceptance tests of hydraulic cylinders in accordance with GOST 18464-96. As a rule, tests on external and internal tightness, moving pressure, idling pressure, smoothness and deceleration time are carried out at the bench.
- Pressure testing of various products is possible.







Services

## Chrome plating of cylindrical parts



- In 2008, a galvanic area was set up for applying solid chrome on long cylindrical billets
- coating hardness is 950 ... 1050 HV. High quality assessment of technology confirmed by independent expertise “Institute of Maas Chemical Analysis” - Germany
- thickness of hard chrome plating is 20 ... 40  $\mu\text{m}$
- size of chrome-plating parts (available) is  $\varnothing 20 \dots 280 \text{ mm}$ ,  $L = 50 \dots 2500 \text{ mm}$
- in 2018, it is planned to significantly expand the size of parts for applying solid chrome.
- 3 patents for invention were obtained:
  - Method of electromechanical chrome plating of cylindrical products. Patent 2400574.
  - Installation for chrome plating of long products Patent 2542198.
  - Installation for chrome plating of long products. (chrome plating of products with ledges, conical, convex, concave surface areas). Patent (application 2017103028).



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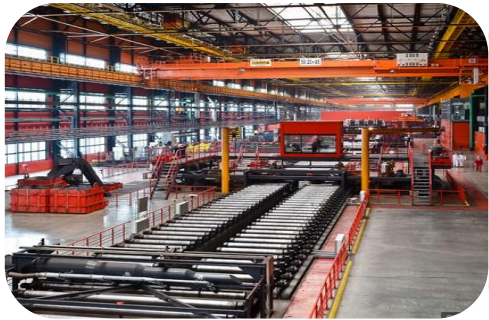
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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

## Services

### Evaluation diagnostics of the quality of work performed by an third-party organization



- Within 10 months, specialists of UrEC conducted technical supervision over the installation of SMS Meer equipment in the Vysota-239 workshop of ChTPZ PJSC
- When performing work, the Customer was provided with monthly reports.
- Due to strict control and requirements for subcontractors, a number of significant nonconformities were eliminated, serious violations were prevented
- **The technical audit allowed to avoid additional costs at the stage of commissioning, increased the service life of the workshop equipment, and also had a positive impact on the pace and quality of installation work in the workshop.**



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**EFFICIENT SOLUTIONS OF COMPLEX ENGINEERING**

Services

## Staff training



Conducting annual training seminars in Chelyabinsk



Conducting seminars in Germany, Japan (at the sites of leading equipment manufacturers)

- The most pressing problems of production are examined at seminars, technical solutions and a number of new products from equipment manufacturers are proposed.
- The interest of listeners is attracted by the proposed integrated approach to solving a particular issue, the possibility of communication between specialists from different enterprises, the exchange of experience, and the receipt of technical advice in a particular case.