



ATOMPROEKT

ROSATOM

Joint Stock Company
Scientific Research and Design Institute for Energy Technologies
ATOMPROEKT
(JSC ATOMPROEKT)

Customer – JSC ASE EC

**TEMPORARY BUILDINGS AND STRUCTURES REQUIRED FOR
CONSTRUCTION OF POWER UNITS №5 AND №6 OF PAKS NPP,
INCLUDING CONSTRUCTION ERECTION BASE**

DETAILED DESIGN

Initial technical specifications
Concrete batching facilities (UXC)
Construction laboratory (5.6)

CEBP.D.P001.8.0UXC&&06&&&.020.SG.0001.E

Revision C01

The document shall not be disclosed to any third party except for the purpose of engaging in the activities aimed at construction of the Project indicated herein

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JOINT-STOCK COMPANY
"INSTITUTE "ORGENERGOSTROY"



Customer - JSC "Atomproekt"

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2020

See continuation on the next sheet

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Continuation of the title sheet

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CEBP.D.P001.8.0UXC&&06&&&.020.SG.0001.E

Revision C01

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Title block

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CONSTRUCTION OF POWER UNITS №5 AND №6 OF PAKS NPP,
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Cadastral number: 8803/16

Concrete batching facilities (UXC)

Construction laboratory (5.6)

CEBP.D.P001.8.0UXC&&06&&&.020.SG.0001.E

Revision C01



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2020

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1 Purpose and scope

1.1 The construction laboratory equipment is intended for use in the Concrete Batching Facilities (UXC) of Paks II NPP Units 5 and 6.

1.2 These Initial Technical Specifications are limited to the design issues and do not cover commercial terms of delivery and prices.

1.3 When ordering and in the documentation, the Equipment for the construction laboratory of the Concrete Batching Facilities (UXC) of Paks II NPP Units 5 and 6 is hereinafter referred to as the Equipment.

2 Design technical justification

2.1 The justification for the design is the requirements for ensuring the processes in the relevant systems of Paks II NPP Units 5 and 6.

3 Conditions, operating modes and basic specifications

3.1 Installation site and environmental parameters

3.1.1 Climatic actions typical for the NPP site.

Absolute air temperature (observed):

- minimum - minus 30.3 °C (humidity 75%);
- maximum - plus 40.6 °C (humidity 16%).

Wind mode:

The design value of the maximum wind velocity corresponding to a 10-minute averaging interval, at a height of 10 m above the ground surface (return period - once every 25 years) is 11.51 m/s.

Snow cover:

The rated characteristic value of the snow cover weight is 0.98 kPa. The snow load with once every 10,000 years return period is 1.5 kPa.

The thickness of the ice wall at a height of 10 m (once every 25 years return period) is 25 mm.

The maximum total daily solar radiation for:

- vertical surface - 1980 J/cm²;
- horizontal surface - 3124 J/cm².

The concentration of natural and industrial pollutants in the atmosphere:

- sulfur dioxide (SO₂), the maximum value is 0.005 mg/m³;
- chlorides (CL), the maximum value is 1.0234 µg/m³;
- nitric oxide (NO), the maximum value is 0.047 mg/m³;
- nitrogen dioxide (NO₂), the maximum value is 0.033 mg/m³;
- the dust content in atmospheric air is 0.039 mg/m³.

Installation height above the sea level should will not exceed 1000 m.

Seismic action.

The maximum accelerations at the Safe Shutdown Earthquake (SSE) in the horizontal directions are 0.11 g. The maximum acceleration in the horizontal direction is 0.07 g.

3.2 Equipment operation modes

3.2.1 The operation mode shall be continuous within the basic specifications.

3.2.2 In normal operation mode the Equipment shall work normally within the basic specifications.

3.2.3 In abnormal operation mode the Equipment operation shall be ensured by the NPP's auxiliary power supply;

3.2.4 Design basis accident mode. The process schedule of the power unit operation does not provide for the necessity to operate the Equipment in the specified mode.

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3.3 Basic specifications of the equipment

3.3.1 The basic specifications of the Equipment are provided in the design demand questionnaires, which are part of these ITS.

3.4 Regulatory framework and equipment classification

3.4.1 The Equipment classification requirements are provided in the design demand questionnaires, which are part of these ITS.

3.5 Requirements for weight and size specifications

3.5.1 The requirements for weight and size specifications are given in the design demand questionnaires, which are part of these ITS.

3.6 Equipment design requirements

3.6.1 General design requirements

3.6.1.1 The equipment is intended for testing of concrete during the construction of Paks II NPP Units 5 and 6.

3.6.1.2 The tests shall be conducted in accordance with the requirements of the regulatory documents and regulatory framework in force in Hungary.

3.6.1.3 The design of the Equipment shall ensure ease of use, maintenance and performance checks during operation.

3.6.1.4 The equipment shall be supplied complete with tools and accessories necessary to perform its functions in accordance with the requirements of the data sheet/ service book. The complete set of the Equipment shall be determined by the manufacturer and according to the questionnaires of the design requirements, which are part of these ITS.

3.6.1.5 Equipment and materials shall meet hygienic and sanitary requirements.

3.6.2 Vibration and Noise Requirements

3.6.2.1 There are no vibration and noise requirements during the operation of the Equipment, unless it is specified in the design demand questionnaires, which are part of these ITS.

3.7 Durability requirements

3.7.1 The Equipment shall ensure uninterrupted operation within the entire service life specified by the manufacturer.

3.8 Reliability requirements

3.8.1 The reliability requirements are determined by equipment manufacturers and shall be confirmed by a data sheet and/or equipment operation manual.

3.8.2 The manufacturer in the provided documentation shall indicate the criteria for failures and limit states of the equipment.

3.9 Safety requirements

3.9.1 Safety requirements for the Equipment shall comply with the requirements of the legal and regulatory framework in force in Hungary.

3.10 Requirements for materials of equipment

3.10.1 Materials and components used for the manufacture of parts and assemblies of the Equipment shall comply with the requirements of the technical documentation. The conformity of materials and components to the requirements of standards and technical specifications shall be supported by a certificate and / or a data sheet issued by the manufacturer.

3.10.2 It is allowed to substitute the materials and components used in accordance with the procedure established by the manufacturer, provided that such substitution does not deteriorate the technical and operational specification of the Equipment as a whole.

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3.10.3 The materials and components used for the manufacture of the Equipment shall be accepted by the technical supervision and comply with applicable standards and specifications.

3.10.4 The materials used shall be wear-resistant in relation to the environment, works performed, materials tested, external influencing factors.

3.11 Requirements for electrical equipment

3.11.1 Information on the requirements for electrical equipment is provided in the design requirements questionnaires included in the ITT data. The equipment shall comply with the documents contained in the "List of referenced documents".

3.11.2 The cables used in the manufacture and supplied together with the equipment shall be agreed with the Owner.

3.12 Requirements for Instrumentation and Controls (I&C), and automation equipment

3.12.1 Measuring instruments (MI), including MI, being part of the supplied equipment, shall comply with the requirements of the Directives of the European Parliament and the Council, shall be approved for operation at nuclear power plants following the established procedure and shall comply with the requirements of Hungarian regulatory documents (national and international regulatory documents used in Hungary). All MI shall be CE marked.

3.12.2 The requirements for MI intercalibration period shall be determined by the equipment manufacturer.

3.13 Maintainability requirements

3.13.1 The equipment belongs to the class of repairable and recoverable products.

3.13.2 The need and scope of repairs shall be justified in the manufacturer's documentation. Maintenance time and period between repairs shall be determined by the manufacturer's guidelines.

3.13.3 The composition of the repair documentation for the equipment is provided in clause 6.1.2.

3.13.4 The repair documentation for the equipment should include a slinging diagram for large-sized components, if necessary, indicating their weight and center of gravity, and other information that ensures the safety of lifting and transportation. The design of equipment assemblies should ensure the ability to sling them during installation.

3.13.5 The design of the Equipment shall guarantee the convenience of assembly and disassembly, repair and operation, taking into account the requirements of reparability with a minimum labor intensity.

3.14 Compliance assessment

3.14.1 The equipment shall be certified in accordance with the equipment supply agreement, if certification is mandatory under the terms of such agreement.

3.15 Quality assurance

3.15.1 The equipment quality assurance requirements shall be set out in the equipment supply agreement and in the purchase specifications.

3.15.2 The quality management system of the Supplier (Manufacturer) at all work stages shall comply with the requirements of ISO 9001:2011 [10].

3.15.3 The equipment quality assurance category according to CEBP.D.P001.8.0UXC&&06&&&.020.SG.0001_C01 is not applicable.

3.15.4 The technical requirements for quality control and commissioning of the compressor and the cabinets serviced by it shall comply with MSZ-09-00.0280:1989 [11].

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3.16 Power consumption, energy saving and energy efficiency requirements

3.16.1 The Equipment shall be designed so that the overall losses are reasonably as low as achievable according to the applicable manufacturing practices. The supplier shall justify that the increase in cost in order to reduce losses will pay off over the life of the Equipment.

3.16.2 The electric motors supplied packaged (as a complete set) shall have an energy efficiency class of at least IE3 under IEC 60034-30-1 [2].

4 Special requirements

4.1 Requirements for Monitoring and Diagnostic Systems (MDS).

4.1.1 Requirements for monitoring and diagnostic systems are not imposed due to the lack thereof.

4.2 Aging management

4.2.1 The Equipment supplier/manufacturer shall develop the aging management guidelines. The guidelines should contain measures for:

- maintenance, inspection, testing and monitoring in order to manage aging processes;
- identification of measures to slow down the aging and deterioration processes, as well as to mitigate the negative consequences thereof.

4.2.2 The operational documents for the equipment shall describe the locations of possible exposure to erosion and corrosion.

4.2.3 The operational documents for the equipment shall describe the typical aging and deterioration mechanisms. The supplier should also provide recommendations for monitoring the status of the components resulting from the action of the specified aging and deterioration mechanisms and the measures to be taken to prevent or mitigate the consequences thereof.

4.2.4 If necessary, the Supplier/Manufacturer shall issue a list indicating the equipment components to be replaced during maintenance or repair, and the frequency of replacement

4.3 Maintenance efficiency monitoring

4.3.1 The manufacturer, based on the requirements of clause 5.3 of the design demands datasheet (service life) and clause 4.2 hereof shall develop the maintenance procedures during operation. The maintenance procedures shall be indicated in the equipment operation documents. The procedures should contain sequentially performed work, including inspection, measurements and parameter checks, preventive maintenance, replacement of parts with a shorter service life or durability, as well as testing. Maintenance shall be carried out at regular intervals between scheduled repairs and is intended to maintain the equipment serviceability and reliability at the level of the requirements specified herein. The maintenance procedure shall contain a list of parts to be replace and the frequency of replacement, as well as requirements for spare parts and the necessary checks of their parameters. The procedures shall contain the requirements for parameter control and control method. The designer, if necessary, shall indicate the permissible deviation limits for the parameters, that necessitate unscheduled maintenance or repair of the equipment when achieved. The parameters shall be monitored either during operation or during maintenance.

4.3.2 All the operation and maintenance requirements of the equipment designer shall be contained in the operation manual and other operational documents.

5 Environmental requirements

5.1 The design and arrangement of the equipment shall ensure that the impact on the environment is limited to values not exceeding those established by the regulatory documents in force.

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6 Requirements for the information provided

6.1 Requirements for the design documents

6.1.1 The documentation to be submitted as part of the full package of operational documents in Russian, Hungarian and English, including the documents necessary for the detailed design elaboration:

- technical description with a detailed list of parameters, showing compliance with these ITS;

- overall and installation (assembly) drawings, including those showing the dimensions and location of construction embedded parts for fixing the equipment, electrical cabinets, etc., indicating the largest transportation and installation weights and dimensions;

- electrical and wiring diagrams of equipment, with a list of equipment, if necessary;
- operational documents (including operation manual) for software;
- documents for auxiliary units and devices supplied complete with the equipment;
- electrical wiring diagrams;
- technical description and installation, operation and repair guidelines

6.1.2 The repair documentation package shall include:

- assembly drawing of the product with the specifications;
- a list of parts with a service life less than the service life of the product;
- consumption rate of spare parts for repair;
- product maintenance and repair (M&R) program;
- a package of process-related documents for the work to be performed during routine maintenance and repair of the product in accordance with M&R program.

6.2 Requirements for the information provided for Safety Report

6.2.1 A description of the design of the equipment and its main components shall be provided. Drawings, figures and diagrams to illustrate the design and operation of the equipment shall be provided.

6.2.2 The basic technical specifications of the equipment and its components shall be provided.

6.2.3 Information on the materials, semi-finished products and components used shall be provided. Justification of their selection, taking into account the normal operation and abnormal operation conditions, including accidents. Information on the certification of materials, their experimental validation, testing by best practices in operation. Explosion and fire hazard specifications of materials. If new materials are used, a justification for their use shall be provided, including, inter alia:

- a comparative analysis of properties (chemical composition and mechanical properties) of the used material and previously used materials;
- a description of existing problems (best operating practices), solved by the use of new material;
- a description of the experimental justification for the use of the new material.

6.2.4 A list and justification of the permissible values of the monitored parameters of the equipment for all operating modes and for the time of withdrawal for repair shall be provided, the location of the control points shall be indicated, the control methods shall be described, information on the metrological certification of the applied methods, as well as the requirements for the instrumentation and controls shall be provided. Requirements for associated control and power supply systems shall be provided. A list of active equipment protections and interlocks shall be provided, as well as operator actions if certain deviations in operation, signals and interlocks have been detected.

6.2.5 The basic requirements for equipment and its components quality assurance during manufacturing and installation shall be provided. It is necessary to substantiate the scope and methods of pre-installation control, acceptance, qualification, acceptance and commissioning tests,

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verifications and inspections during operation, their metrological support; to provide and substantiate the list and allowable values of the parameters to be controlled in this case and requirements to the control and measuring instruments and accessories used in the tests. A transformer operation manual with an indication of the maintenance and repair (M&R) schedule and the necessary instruments shall be provided.

6.2.6 Indicators of reliability (durability, failure-free performance, shelf life, maintainability), failure criteria and criteria for the equipment limit states, as well as justification thereof shall be provided.

6.3 Requirements for the detailed design basis

6.3.1 The list of documents to be provided for the detailed design elaboration is given in subsection 6.1.1.

7 Novelty requirements

7.1 The supplier is obliged to guarantee the novelty of the applied solutions and technical documentation. If the Supplier has valid titles of protection for the technical solutions used in the product, copies of the said documents of title shall be attached to the technical documentation.

8 Designation codes

8.1 Equipment designation codes

8.1.1 The Paks II NPP project applies the "KKS Power Plant Classification System".

8.2 Designation requirements

8.2.1 The designations shall contain a KKS code. The method of marking application shall be determined by the Supplier / Manufacturer.

9 Complete set requirements

9.1 The requirements for complete set are given in the design demand questionnaire, which is part of these ITS.

The equipment complete set according to these ITS shall include:

No.	Name of the equipment, product or material	Type, brand, model, code	Technical specifications	Unit	Qty.
1	Universal steaming chamber	type KPU-1M-NS	Max. storage volume: • cubes with face dimensions of 100 mm - 24 pieces; • cubes with face dimensions of 150 mm - 15 pcs. N = 4.0kW, 1ph. U=230V; 50 Hz;	pcs.	1
2	Hydraulic tensile machine with tensile / compression force, kN-500/1500 for rebars from 6 to 25 mm.	type Matest H011N with electronic force meter "CYBER-PLUS EVOLUTION"	Complete set: a set of grippers, strain gauges, protective screen N=0.75kW, U=230V; 1ph., 50Hz;	pcs.	1
3	Reinforcement bending test machine	type Matest H065N	Static bending of steel rebars for reinforced concrete by 180°, or bending by 90° and subsequent straightening to a given angle (at least 20°). Holders for rebars from 5 to 40 mm; N=1.5 kW, U=230V; 1ph., 50Hz;	pcs.	1
4	Electromechanical tensile machine 600 kN force for rebars with a diameter of 11- 55 mm	type Matest H008	Complete set: grippers and testing fixtures N=3.0kW, U=400V; 3ph., 50Hz;		1

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5	Dual-range compression-testing machine for concrete samples of 2000/250 kN force	type Matest C077PN141	Complete set: distance plates Calibration accuracy: Class 1.0 N=0.75kW, U=230V; 1ph., 50Hz;	pcs.	1
6	Dual-range compression and bending testing machine for cement	type Matest E1831N Servoplus	Loading limit 300/15 kN; N=0.75kW, U=230V; 1ph., 50Hz; 1030x400x1500 mm	set	1
7	Deep-freeze chamber	type Vestfrost VT-147	V=140 l, T (-30...- 60°C) supplied with one basket. Dimensions 55x44x65. N=0.3kW, U=230V; 1ph., 50Hz;	pcs.	1
8	Electromechanical tensile machine of 5 kN	type Tinius Olsen TO-LI-3391-01-2017 (5ST)	complete set includes grippers and testing fixtures; Load measurement error: ±0.5% in the range 0.2-100%; N=1.0 kW, U=230V; 1ph., 50Hz;	pcs.	1
9	Universal vibrating screen	type Matest A059-02-KIT	complete set: rod A059-ASTE with fixing screw (2 pcs); Soundproof cabinet A058 N=0.75 kW, U=230V; 50 Hz; 1ph.	pcs.	3
10	Exhaust hood	type Waldner	1200x900x2400 mm, ceramic table top, luminaire, sockets, cold water tap, drain sink, pedestals, ventilation DN 250 mm; Panel (complete) with 4 sockets 230 V, 16 A, 3ph.	pcs.	2
11	Concrete mixer of compulsive action 40 l	type SM-40	blades rotation speed - 30 rpm 1ph; N=1, kW; 50 Hz; U=230V	pcs.	1
12	Drying cabinet	type BINDER FED 400	Vchamber=400 l, T=300°C, digital thermostat, programmer, RS-232 interface, fan with power control, timer: 0-100h, shelves: 2/10 (order); U=400 V; 1ph: 50 Hz; N=3.4 kW	pcs.	1
13	Drying cabinet	type Matest BINDER FD115	V=115 l, temperature +300°C, digital thermostat, fan, 2 shelves U=230V; 1ph: 50 Hz; N=1.6kW.	pcs.	5
14	Automatic unit for concrete water-tightness testing (according to EN)	type Matest C435-01	complete with: 1) air compressor V206 (240 l/min, receiver 50 l) 2) E138-11 kit for connecting the compressor N=1.0 kW U=230V; 1ph: 50 Hz; 1400x750x1850 mm	set	1
15	Muffle furnace	type Matest A024-02N	V chamber - 12 l; T=1200°C, U=230V; 1 ph., 50Hz; N=4.2kW	pcs.	2
16	Storage cabinet for concrete and cement samples (STANDARDS: EN 196/1 - ASTM C87, C109, C190, C191- UNE 80102) (Normal hardening chamber)	type Matest E138	Number of samples, max - 300 pcs, 100x100 mm; U=230V; 1ph., N=4.0 kW Additionally: E138-11 Tubes and adapters for connecting the compressor	pcs.	6
16a	Air screw compressor plant	type Atlas Copco GA 7 VSD+	Performance 0.42-1.3 m3/min, 7 bar, receiver included, oil separator 630x610x1420; N=7.5kW; 3ph., U=400B;	pcs.	1

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9.2 The equipment shall be accompanied with operational and repair documents in Russian, Hungarian and English. The documents shall be provided both in hard and soft copies (electronic version). The number of copies shall be determined by the supply agreement.

The documents to be provided to the Customer shall include:

9.2.1 Design documents in accordance with section 6.1.1.

9.2.2 Repair documents in accordance with section 6.1.2.

9.2.3 Operational documents:

- data sheets for equipment and components (originals and copies);
- certificates of manufacturers of materials and semi-finished products containing data on chemical composition and mechanical properties - upon request;
- certificates, reports of calibration for instruments supplied complete with the equipment;
- list of spare parts, instruments and accessories for installation, commissioning, operation and maintenance during the warranty period, including the equipment of the Monitoring and Diagnostic Systems (MDS), including the upper level;
- list of consumables for installation and commissioning.
- list of handling devices for installation;
- operation manual;
- guidelines for de-preservation and re-preservation, transportation, storage;
- guidelines for installation, start-up and operation, maintenance, loading, transportation and storage;
- copies of certificates of conformity for equipment;
- technical documentation for product components;
- acceptance certificate;
- reports on nonconformities identified during the equipment manufacture and corrective actions taken in this regard.

9.2.4 Accompanying documents:

- packing list;
- shipping specifications;
- delivery list, indicating the dimensions, volumes and weights of the equipment and its delivery units;
- shipment notice;
- waybills;
- invoices for the supplied equipment;
- waybills, consignment notes;
- driver's trip tickets;
- work acceptance and transfer certificates.

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10 Packaging, transportation and storage requirements

10.1 The requirements for packaging, transportation and storage of Equipment (equipment consignments) shall comply with the equipment supply contracts and the relevant Hungarian regulations in force. These requirements shall be indicated in the technical documentation and data sheets for the transformer and components transferred to the Owner.

10.2 The materials and components must be effectively protected from damage and deterioration during transportation and storage. The methods for protecting materials and components during transportation and storage shall be elaborated by the manufacturers.

11 Requirements for handover and acceptance rules.

11.1 The requirements for the equipment handover and acceptance rules shall be provided in the supply contracts.

12 Requirements for the scope and/or duration of warranty

12.1 The requirements for the scope and/or duration of the equipment (equipment consignments) warranty shall comply with the equipment supply contracts and the relevant Hungarian regulations in force. These requirements shall be indicated in the technical documentation and data sheets for the equipment.

13 Requirements for the provision of installation, setting up and maintenance

13.1 The requirements for the provision of installation, setting up and maintenance shall be set out in the equipment supply contract.

14 Requirements for technical training of the Owner's staff

14.1 The requirements for technical training of the Owner's staff shall be set out in a separate contract.

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List of abbreviations

APCS	- Automated Process Control System
NPP	- Nuclear Power Plant
IDB	- Integrated Design Bureau
EIF	- External Influencing Factors
HV	- Higher Voltage
ASW	- Air Shockwave
P&A	- Spare parts, tools, accessories and measuring instruments
ITS	- Initial Technical Specifications
I&C	- Instrumentation and Controls
LV	- Low Voltage
IEC	- International Electrical Commission
SAR	- Safety Analysis Report
SSE	- Safe Shutdown Earthquake
MI	- Measurement Instruments
MDS	- Monitoring and Diagnostic System
MT	- Maintenance
M&R	- Maintenance and Repair

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Note - If a regulatory document referred to in these ITS is no longer in force, the equipment must comply with the regulatory document that came into force to supersede the withdrawn document, unless otherwise specified in the supply contract.

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