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(JSC ASE EC)**

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Paks II NPP

Units 5 and 6

Technical specifications

for the hydraulic conveyor of building 50ULR

PKS2.B.N000.5.0ULR&&&&&&.023.SG.0010.E

Revision B02

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2021

Continued on the next page

Title sheet (continued)

Paks II NPP Units 5 and 6
Technical specifications for the hydraulic conveyor of
building 50ULR
PKS2.B.N000.5.0ULR&&&&&&&.023.SG.0010.E
Revision B02

Quality inspection

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ANNOTATION

1 This documentation applies to Paks II NPP Units 5, 6.

2 The technical specifications are developed to provide delivery of the equipment of the required quality to the Paks II NPP site.

3 These general technical requirements are used for the competitive selection of suppliers of the equipment meeting these requirements.

4 Revision B02 is based on the Owner's comments presented in official letter No. KDO/361-2048/2020 dated 18 December 2020.

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LIST OF REGULATORY DOCUMENTS

Code of regulatory document	Name of regulatory document	Document code	Notes
MSZ EN ISO 3834-1:2006	Quality requirements for fusion welding of metallic materials. Part 1: Criteria for the selection of the appropriate level of quality requirements (ISO 3834-1:2005)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0161
MSZ EN ISO 12944-2:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments (ISO 12944-2:2017)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5259
BM Decree 54/2014. (XII.5.) OTSZ	Decree 54/2014. (XII.5.) of the Minister of the Interior on National Fire Protection Regulations (OTSZ)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1633
Govt. decree 118/2011. (VII. 11.)	Govt. Decree 118/2011 (VII. 11.) on the nuclear safety requirements of nuclear facilities and on related regulatory activities	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1636
MSZ EN 10228-4:2016	Non-destructive testing of steel forgings. Part 4: Ultrasonic testing of austenitic and austenitic-ferritic stainless steel forgings	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6861
MSZ EN 60706-5:2008	Maintainability of equipment. Part 5: Testability and diagnostic testing (IEC 60706-5:2007)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0294
ISO 15534-1:2000	Ergonomic design for the safety of machinery - Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 3108
MSZ EN 10228-3:2016	Non-destructive testing of steel forgings. Part 3: Ultrasonic testing of ferritic or martensitic steel forgings	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6859
MSZ EN ISO 22825:2018	Non-destructive testing of welds. Ultrasonic testing. Testing of welds in austenitic steels and nickel-based alloys (ISO 22825:2017)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6792
MSZ EN ISO 3506-4:2010	Mechanical properties of corrosion-resistant stainless steel fasteners. Part 4: Tapping screws (ISO 3506-4:2009)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5300
MSZ EN ISO 3506-3:2010	Mechanical properties of corrosion-resistant stainless steel fasteners. Part 3: Set screws and similar fasteners not under tensile stress (ISO 3506-3:2009)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5299
Act LXXII of 2000	Act LXXII of 2000 on safety of employees from air pollution, noise and vibration	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1775

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MSZ EN ISO 13732-1:2009	Ergonomics of the thermal environment. Methods for the assessment of human responses to contact with surfaces. Part 1: Hot surfaces (ISO 13732-1:2006)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 7176
MSZ EN ISO 3746:2011	Acoustics. Determination of sound power levels and sound energy levels of noise sources using sound pressure. Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5302
MSZ EN ISO 3834-3:2006	Quality requirements for fusion welding of metallic materials. Part 3: Standard quality requirements (ISO 3834-3:2005)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0163
MSZ EN 10269:2014	Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0389
MSZ EN ISO 12944-1:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 1: General introduction (ISO 12944-1:2017)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0206
MSZ EN ISO 4871:2009	Acoustics. Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1446
MSZ EN 13460:2009	Maintenance. Documentation for maintenance	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0420
Ministerial Decree 22/2005. (VI.24.)	Ministerial decree 22/2005. (VI.24.) EuM on minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1720
MSZ EN 13480-1:2017	Metal industrial pipes. Part 1: General provisions	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6444
MSZ EN ISO 12944-4:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 4: Types of surface and surface preparation (ISO 12944-4:2017)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5261
Act LXXV of 2000	Act LXXV of 2000 on the promulgation of ILO Convention 155 concerning Occupational Safety and Health and the Working Environment, adopted at the 67th Session of the International Labor Conference in 1981	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1776

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MSZ EN 1092-1:2018	Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories, Pn designated – Part 1: Steel flanges	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6390
MSZ EN 60706-2:2006	Maintainability of equipment. Part 2: Maintainability requirements and studies during the design and development phase (IEC 60706-2:2006)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0292
MSZ EN ISO 12944-6:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 6: Laboratory performance test methods (ISO 12944-6:2018)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 3891
MSZ EN ISO 14001:2015	Environmental management systems. Requirements with guidance for use (ISO 14001:2015)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6744
MSZ EN ISO 3834-2:2006	Quality requirements for fusion welding of metallic materials. Part 2: Comprehensive quality requirements (ISO 3834-2:2005)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0162
MSZ ISO 1996-1:2009	Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0019
MSZ 27003-1-3:2013	Rules for construction of nuclear facility components. Division 1., Subsection ND: Class 3. Components	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 2905
MSZ EN ISO 17663:2009	Welding. Quality requirements for heat treatment in connection with welding and allied processes (ISO 17663:2009)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0105
Ministerial Decree 3/2002. (II. 8.) SzCsM-EuM	Joint Decree of the Ministry of Social and Family Affairs and the Ministry of Health on the minimum safety requirements for the workplace	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1739
MSZ EN ISO 12944-5:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 5: Protective paint systems (ISO 12944-5:2019)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5262
MSZ EN 13068-3:2002	Non-destructive testing. Radioscopic testing. Part 3: General principles of radioscopic testing of metallic materials by X- and gamma rays	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0410
MSZ EN 60706-3:2007	Maintainability of equipment. Part 3: Verification and collection, analysis and presentation of data (IEC 60706-3:2006)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0293
MSZ EN 60721-2-1:2014	Classification of environmental conditions. Part 2-1: Environmental conditions appearing in nature. Temperature and Humidity (IEC 60721-2-1:2013)	PKS2.B.N000.5.0U LR&&&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0821
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MSZ EN ISO 12100:2011	Safety of machinery. General principles for design. Risk assessment and risk reduction (ISO 12100:2010)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 2596
MSZ EN ISO 3834-4:2006	Quality requirements for fusion welding of metallic materials. Part 4: Elementary quality requirements (ISO 3834-4:2005)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 0164
MSZ EN ISO 17640:2019	Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels, and assessment (ISO 17640:2018)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5288
MSZ EN ISO 17635:2017	Non-destructive testing of welds. General rules for metallic materials (ISO 17635:2016)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5284
MSZ EN ISO 3834-5:2015	Quality requirements for fusion welding of metallic materials. Part 5: Documents with which it is necessary to conform to claim conformity to the quality requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4 (ISO 3834-5:2015)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5303
BM Decree 5/2015. (II.27.) NTSZ	Decree 5/2015. (II.27.) of the Minister of the Interior on the specific fire protection requirements related to the use of nuclear energy and on the method of their enforcement during the activities of the authorities. (NTSZ)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 1637
MSZ EN ISO 3506-1:2010	Mechanical properties of corrosion-resistant stainless steel fasteners. Part 1: Bolts, screws and studs (ISO 3506-1:2009)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5297
ISO 3864-1:2011	Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6876
MSZ EN ISO 3506-2:2010	Mechanical properties of corrosion-resistant stainless steel fasteners. Part 2: Nuts (ISO 3506-2:2009)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5298
MSZ EN ISO 11666:2018	Non-destructive testing of welds. Ultrasonic testing. Acceptance levels (ISO 11666:2018)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 6962
MSZ EN ISO 12944-7:2018	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 7: Execution and supervision of paint work (ISO 12944-7:2017)	PKS2.B.N000.5.0U LR&&&&&&&.023.SG.0010.E-MZY0001	NTD ID: 5263

Note - If the regulatory document on which there is a reference in these initial technical requirements has become invalid, then the equipment must comply with the regulatory document

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which has become effective instead of the invalid one, unless otherwise is stated in the Supply Contract.

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General technical requirements

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1 Purpose and scope of application

1.1 These technical specifications are applied to development, materials, manufacturing, quality assurance, control and supply of hydraulic conveyors, which is included in the turbine condensate purification system (LDP) for the Paks II NPP units 5 and 6.

1.2 The hydraulic conveyor is designed for ion-exchange resin loading in filters.

1.3 One (1) hydraulic conveyor is provided for one power unit.

1.4 The hydraulic conveyor must be supplied to the Paks II NPP with its subsequent finishing according to the current regulatory documents and design conditions specified bellow.

1.5 The technical specifications apply to the equipment design aspects only and do not cover commercial conditions for delivery and price.

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2 Technical justification of development (modification)

2.1 These technical specifications are developed to ensure the required quality of equipment supplied to the NPP facilities.

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3 Operation conditions and basic characteristics

3.1 Location and ambient parameters

3.1.1 Information on the equipment location is given in the Design Requirements Data Sheet (DRDS) included in these technical specifications.

The classes of groups of environmental parameters for installation and operation of equipment are 3K3/3Z1/3B1/3C1L/3S2/3M1 according to MSZ EN 60721-3-3.

3.1.2 The fire hazard category of room 50ULR08R313 is given in the DRDS included in these technical specifications.

3.1.3 Ambient conditions in building 50ULR are as follows:

temperature, C	from plus 15 to plus 35
pressure	atmospheric
relative humidity	up to 85

3.1.4 Climatic version of the equipment is Temperate according to MSZ EN 60721-2-1.

3.2 Operation conditions of the equipment

3.2.1 The hydraulic conveyor must remain durable and fulfil its functions in normal operation mode (DBC1).

3.2.2 The hydraulic conveyors are subject to calculation for seismic loads A^{seism} with peak ground acceleration $PGA^{MSZEN 1998} = 0.12g$.

3.2.3 Floor response spectra will be additionally submitted upon completion of the survey, collection of required initial data and estimations.

3.3 Basic characteristics of the equipment

3.3.1 The basic characteristics of the equipment are given in the DRDS included in these technical specifications.

3.3.2 Blank fields in the DRDS indicate that the given parameters are not regulated or no requirements are set forth.

3.4 Regulatory framework and equipment classification

3.4.1 The requirements for classification of equipment are given in the DRDS included in these technical specifications.

3.4.2 Development, manufacture and supply of the equipment must comply with the requirements of the current regulatory documents of Hungary, the European Union and the Russian Federation.

3.4.3 The applicable regulations, standards and rules (in order of priority) must be based on the following documents:

- current legislative documents of Hungary, including the regulations of the European Parliament and the Council;
- standards related to the Hungarian law, other necessary applicable national standards of Hungary;
- existing safety requirements and guidelines of the International Atomic Energy Agency;
- relevant European standards;
- relevant effective standards of international standardization organizations;
- relevant effective nuclear and non-nuclear standards in the Contractor's country, relevant approved internal standards, procedures and other regulatory documents used by the Contractor.

3.4.4 When using other regulatory and technical documentation, including Russian regulatory documents for atomic energy use, the Supplier must obtain approval of the procedure for their application from the Contractor, the Owner and HAEA. All possible deviations from the requirements of regulatory documents at the stage of the equipment supply (manufacture) contract

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must be specified by the Supplier (Manufacturer), and the acceptability of these deviations must also be approved.

3.4.5 The main regulatory documents are listed in the table "List of regulatory documents"
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3.4.6 Safety class and seismic category of the equipment are determined according to Hungarian Government Decree № 118/2011 (VII.11.) Annex 3/A.

3.4.7 Quality assurance category of the hydraulic conveyor is assigned in accordance with PKS2.P.P000.&.&&&&&.&&&&&&.089.YH.0001.E "Classification of Quality Assurance Categories" [1] and is specified in the DRDS for each piece of equipment.

3.5 Equipment weight and size requirements

3.5.1 The requirements for weight and size (overall dimensions, weight, arrangement of nozzles, connection dimensions) are specified in the DRDS and in sketch drawing 50ULR-MMD0028 included in these technical specifications. Any deviations from these characteristics beyond the tolerances are subject to the Customer's approval.

3.5.2 The design weight of the hydraulic conveyor must not exceed the value specified in the DRDS.

3.6 Requirements for the equipment design

3.6.1 General design requirements

3.6.1.1 The equipment design must be based on the proven configuration and experience of operation in similar conditions. The supplied equipment must have references. In case of standard products, reference means that such a standard product has already been manufactured, put into operation and operated successfully. In case of unique design, the references mean that the company has already designed and manufactured similar equipment as per the required standards, which has already been put in service and operated with good results.

If there are no references, the operability of the equipment has to be confirmed by testing.

3.6.1.2 Design of the hydraulic conveyor provides its operation in the modes specified in subsection 3.2 of these technical specifications and DRDS.

3.6.1.3 The equipment and its components must represent an integrated complex with safe operation.

3.6.1.4 The hydraulic conveyor design must ensure:

- drainage of operating medium and complete discharge of the equipment;
- complete air removal while filling the system with operation medium;
- no places causing accumulation of corrosion products and impurities;
- visual inspection of the internal / external surfaces, ease of maintenance and inspections during operation.

- possibility of anti-corrosion protection;

3.6.1.5 Provided that the equipment is stored, installed and preserved according to the specified rules, its internal surfaces must be in such condition that ensures the equipment is serviceable during tests and operation without cleaning the surfaces from corrosion and dirt during installation.

3.6.1.6 The equipment design, in terms of ergonomic requirements, is to ensure convenient maintenance, operation and monitoring of both the equipment itself and all devices and instruments installed on it as per applicable standards, e.g. ISO 15534, MSZ EN ISO 13732-1.

3.6.1.7 Structurally, the hydraulic reloading system must include: a hydraulic conveyor with a hopper body, flanges with shut-off valves and flexible hoses.

3.6.1.8 Design solutions must be confirmed by standards, analysis, experiments, typical tests and /or operational experience.

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3.6.1.9 Production, mounting and operational effectiveness must provide achievement of the preset indices of the equipment quality during its production, mounting, operation.

3.6.1.10 The components must be designed and installed to meet specific functional requirements:

- favourable conditions for operational loads on the components, taking into account the loads from the system;
- favourable distribution of loads, especially in places of heterogeneous structure (nozzles, transitions, support points);
- use of dissimilar materials in one component must be minimized to the required volume.

In this case, the Supplier must provide a detailed analysis of the concerned parts and a list of references to determine whether the proposed configuration meets the expected service life of the equipment. Forms and materials of the equipment must be chosen to provide favourable conditions for processing and non-destructive testing;

- shape of the parts and configuration and arrangement of welds must allow for non-destructive testing with sufficient flaw analysis of products, welded joints and installed components.

3.6.1.11 The number of weld joints must be minimal; arrangement of weld joints must ensure the possibility of their inspection and testing. It is preferable to use ultrasonic testing, which is performed without destructive effects.

3.6.1.12 The equipment must be designed for the specified design temperatures, the minimum / maximum design temperatures, that are allowable at the maximum allowable operation pressure derived from the actually used material thickness.

3.6.1.13 Design of the equipment must exclude erosion and corrosion (including stress corrosion cracking) as much as possible. The main aim is to prevent the occurrence of erosion or corrosion that could impair safety or the normal operation of a nuclear power plant throughout its entire life cycle.

3.6.1.14 The equipment is designed to ensure transportation, installation, maintenance and inspections during operation. For this purpose the following must be provided:

- special sling devices or structural components (places) for gripping by the load-lifting equipment used during transportation and installation;
- drain and overflow nozzles.

3.6.1.15 The sling devices or structural components as well as removable gripping devices must be designed and tested according to the requirements of regulatory documents for lifting weight including weight of equipment, metal works, pipelines and their fasteners, thermal insulation, anti-corrosion coating and other components fastened to the equipment prior to its hoisting and installation on the place of its operation.

3.6.1.16 Transported parts of the oversized components must be delivered with welded fixtures to assemble on-site connection for welding.

3.6.2 Body requirements

3.6.2.1 The body is a hopper into which resin is loaded. A supporting structure on wheels is attached to the body. Also, a branch pipe for supplying ejecting liquid (with shut-off valves) and a water-jet ejector for removing resin (with shut-off valves) are attached to the body.

3.6.2.2 Joint welds must not be located in the areas of high loads and stresses. Thickness of the apparatus body and other units must be sufficient to protect from external mechanical impacts and loads from the pipelines and other components and to prevent the equipment and adjusted surfaces from deformation.

3.6.2.3 Welding and other special processes must meet the requirements of the applied codes and standards (for example, MSZ EN ISO 3834 “Quality requirements for fusion welding of metallic materials”, MSZ EN ISO 13920 “Welding. General tolerances for welded constructions. Dimensions for lengths and angles. Shape and position”, EN ISO 15614 «Specification and

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qualification of welding procedures of metal materials welding procedures. Welding procedure tests», MSZ EN ISO 17663 “Welding. Requirements for the quality of heat treatment in the process of welding and of related processes”) and depicted in the quality and manufacture requirements for hydraulic conveyors.

3.6.2.4 Design, arrangement and geometry of weld joints must provide sufficient space to perform their control during manufacturing and operation, maintenance and repair.

3.6.2.5 Non-destructive test must comply with the requirements of the applied codes and standards, for example MSZ EN ISO 17635 “Non-destructive testing of welds. General rules for metallic materials”, ISO 11666 “Non-destructive testing of welds. Ultrasonic testing. Acceptance levels”, MSZ EN 13068 “Non-destructive tests. Radioscope inspection. MSZ EN ISO 17640 “Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels, and assessment”, MSZ EN ISO 22825 “Non-destructive testing of welds. Ultrasonic testing. Test of austenitic steel welds and nickel-alloy welds”, MSZ EN 10228-3 “Non-destructive tests for forged steel. Part 3. Ultrasonic test of ferritic or martensitic steel forgings”, MSZ EN 10228-4 “Non-destructive tests for forged steel. Part 4. Ultrasonic test of austenite and ferritic-austenite stainless steel forgings

3.6.3 Requirements for branch pipes, flanges, reducers and nozzles

3.6.3.1 Connections between flexible hoses and pipelines / hydro-conveyor nozzles must be flanged.

3.6.3.2 The branch pipes must not be installed in the stress zones. Otherwise, a local detailed analysis must be performed to confirm integrity in view of concentration of tension and fatigue.

3.6.3.3 The branch pipes must be welded to the body by means arc-seam welds.

3.6.3.4 Diameters of the hydro-conveyor nozzles must correspond to diameters of the connected pipelines.

Connecting dimensions of the pipelines will be determined after signing the Supply Contract, before the stage of TA / TS approval.

3.6.3.5 The branch pipes, flanges, connections, reducers, etc. must be designed so as pipe-runs between welds must be minimum 100 mm to perform non-destructive control of the weld joints.

3.6.3.6 The permissible loads on the hydro-conveyor nozzles resulting from the external connected pipelines must be determined.

3.6.3.7 For flanged connections it is required to choose standard flanges.

3.6.3.8 The torque moment must be specified and confirmed for bolts and nuts.

3.6.3.9 Flanges are provided for easy dismantling of the equipment during repairs; they eliminate the need for cutting pipelines. Flange connections and flange gaskets must comply with the requirements of the applied standards, for example, EN 1092-1 “Flanges and joints.” Round flanges for pipes, valves, fittings and accessories defined with nominal pressure. Part 1. Steel flanges”. Flange gaskets must comply with ISO 7483 “Dimensions of gaskets for use with flanges to ISO 7005. Dimensions”;

3.6.3.10 Design of the equipment must provide the possibility to be subject of hydraulic testing within the scope of pipe-runs. The need to install the nozzles for hydrotesting or no need (impossibility) of hydrotesting is approved by the Customer.

3.6.4 Requirements for fasteners

3.6.4.1 Fasteners must comply with the requirements of ISO 898, ISO 3506 for the parts made of corrosion resistant stainless steel.

3.6.4.2 Fasteners (bolts, studs, nuts) for the flanged connections are made, as a rule, of steel of the same structural class as the connected components. If the materials with different

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coefficients of thermal expansion are used, then it is necessary to consider impact of different thermal expansion and to get preliminary approval of the Owner.

3.6.4.3 The torque moment must be specified and confirmed for bolts, nuts and fasteners.

3.6.4.4 Flange gaskets must comply with the requirements of the used standards and must not contain asbestos, Cl (chlorine), F (fluorine).

3.6.5 Requirements for other parts and products

3.6.5.1 The equipment Supplier provides flexible hoses with quick couplings complete with the equipment. These parts must be design and installed so that to provide operation of the process system with the preset flow rate. The criteria of filter elements replacement must be specified.

3.6.5.2 Gaskets must withstand the preset pressure, temperature, radioactivity, chemical impact of the pumped (heating, etc.) medium and environmental impacts.

3.6.5.3 Material of the gaskets and their arrangement must provide the most appropriate geometrical fitting between laying and the isolated surface was reached.

3.6.5.4 Process covers and plugs are the elements required only for the NPP nuclear tests (hydraulic tests, etc.). The process covers and plugs must not be arc-seam welded but must be welded in 3/4 thickness.

3.6.6 Requirements for stability of operation

3.6.6.1 Hydrodynamic characteristic of the equipment must comply with the process requirements and other design requirements specified for this equipment. The equipment must be designed so as its dimensions, geometry and volume provide the possibility of hydraulic operation.

3.6.6.2 Design decisions must prevent from the risk of hydraulic discontinuity or unacceptably large flow rates of the operation medium.

3.6.6.3 The equipment under pressure, its internal parts and pipelines must be designed so that speed of flows and fluctuations caused by them and also changes of phases and temperatures in the intermediate medium do not cause erosion, corrosion, erosion-corrosion, metal fatigue or other defects.

3.6.6.4 If the equipment can store the significant volume of liquid, then hydrodynamic loads caused by dynamic excitation must be considered. The effect of equipment under pressure/pumped medium interaction must also be considered.

3.6.6.5 The branch pipes, I&C connections and internal structures must be arranged and designed so, that significant drop of temperature and loss of pressure or other conditions could not affect the preset functions and process operations.

3.6.7 Vibration and noise requirements

3.6.7.1 Design of the equipment must prevent from vibration caused by movement of the hydraulic flows.

3.6.7.2 All components of the equipment must be designed according to the noise restrictions for the personnel protection and for restriction of the external noise.

3.6.7.3 Mechanical vibrations and noise level of the hydraulic conveyor must meet the requirements specified in section 3.9.

3.7 Strength requirements

3.7.1 Strength analysis is aimed to demonstrate that operability of the hydraulic conveyor is ensured in accordance with the design requirements and conditions.

A mechanical stress analysis of the equipment operating under pressure must verify the following:

a) that the service life of the inspected equipment is sufficiently long, with all expected loads and ageing processes throughout the entire service life taken into account;

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b) mechanical properties of structural materials, criteria specified for ageing, and operating conditions with a margin for the maximum loads arising during operation;

c) considering the intensity of strain and plastic deformation, the impact strength of the structures must be always lower than the corresponding specified maximum temperature

3.7.2 Mechanical, hydraulic, thermal, vibration and any other loads which may affect the integrity, tightness, stability or operability of the equipment assemblies throughout the service life in design operating conditions, including anticipated operational occurrences, accidents and seismic impacts, must be considered and used as input data for the hydraulic conveyor.

3.7.3 The hydraulic conveyor must remain durable and operable during all external impacts specified in item 3.2.

3.7.4 Support of the equipment must be calculated in view of all factors to which they are exposed during operation (including accidents) according to the design bases.

3.7.5 If during manufacture, testing and transportation the equipment and its components are exposed to the loads exceeding the loads during operation and tests, then these loads must be taken into account during equipment designing.

3.8 Reliability requirements

3.8.1 Reliability requirements are given in the DRDS included in these technical specifications.

3.8.2 Expected ageing effects, wear, potential degrading related to ageing and their consequences must be evaluated when the equipment is under design.

The equipment Designer must provide evidence in the submitted documentation that ageing processes affecting structural materials, analysed margins of error for the initial condition and ageing processes do not prevent the equipment from fulfilling its functions throughout the entire service life.

3.8.3 Service life between repairs must be specified so that a periodic repair falls in with 18-month intervals and no less than eight-year repair cycle of the reactor plant. Moreover, the equipment must be available for operation during repairs of the reactor plant.

3.8.4 The equipment Designer must specify the failure criteria and equipment limit states in submitted documentation as well as provide analyses of equipment failures and measures to prevent failures.

3.8.5 The equipment Supplier must specify the durability characteristics and service life of the equipment in the equipment design documentation (including technical datasheets). The Supplier must submit the results of strength calculations, equipment service life analysis and substantiation of operation lifetime according to requirements of the applied standards for strength and operability.

Reliability indices must be confirmed by calculations or experimentally.

3.8.6 The equipment Supplier must offer methods for estimating and predicting the residual durability and provide a list of monitored parameters for hydraulic conveyor operability.

3.8.7 For the components with a service life less than the service life of the equipment to be replaced during operation, the Developer must provide in the documentation for the equipment the information necessary to develop a plan for components replacement.

3.9 Safety requirements

3.9.1 The equipment design must provide safe installation, pre-commissioning, operation, maintenance and repair of the equipment according to MSZ EN ISO 12100 "Safety of machinery. General principles for design. Risk assessment and risk reduction.

3.9.2 The equipment must meet occupational safety standards: Law LXXV dated 2000. "On Minimum Health and Safety Requirements regarding the Exposure of Workers to the Risks Arising from Physical Agents (Vibration)". "On Occupational Safety and Health", Ministerial decree

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3/2002.", (II. 8.) "On minimum health and safety requirements"; Ministerial decree 72/2003. (X.29) "On the Issue of the Safety Code for Working On Live Equipment"; Ministerial decree № 22/2005. (VI.24.) "On minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration)".

3.9.3 The equipment design must comply with fire safety requirements according to Decree of the Minister of Interior 54/2014. (XII. 5.) "National Fire Protection Regulations" and according to Decree of the Minister of Interior No. 5 dated 27.02.2015 "On Specific Fire Safety Requirements Associated with the Application of Atomic Energy and on the Method of their Enforcement in the Practice of Authorities".

3.9.4 Vibration safety requirements are in accordance with Law LXXII as of 2000 "On Safety of Employees from Air Pollution, Noise and Vibration" and Ministerial Decree No. 22/2005. (VI.24.) "On minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration)".

3.9.5 Noise protection requirements are in accordance with Law LXXII as of 2000. "On Safety of Employees from Air Pollution, Noise and Vibration", "On the Minimum Health and Safety Requirements Regarding the Exposure of Workers to Noise".

Documentation for the pump set must contain noise characteristics of the equipment determined in accordance with MSZ EN ISO 3746 "Acoustics. Determination of Sound Power Levels of Noise Sources Using Sound Pressure. Survey Method Using an Enveloping Measurement Surface Over a Reflecting Plane" and MSZ EN ISO 4871 "Acoustics. Declaration and Verification of Noise Emission Values of Machinery and Equipment".

3.9.6 Installation, dismantling and operation of the equipment must be carried out as required by the operational documentation using tools and accessories that meet occupational safety requirements. The operational documentation must contain instructions on how to ensure safety of the maintenance and repair personnel.

3.9.7 The Supplier must fulfil the main health and safety regulations (e.g. Decree 3/2002. (II. 8.) on minimal requirements of labour safety at workplaces), to provide labour safety of the personnel.

3.9.8 Designs, materials and equipment at workstations must be safe during handling, repair and maintenance.

3.9.9 Hazardous impacts of chemicals must be minimized up to the level which is not hazardous for personnel safety and health.

3.9.10 The equipment must comply with:

- general safety requirements for the equipment according to the relevant standards;
- safety requirements for the components according to the technical documentation for their supply.

3.10 Requirements for materials of equipment

3.10.1 The quality and properties of materials used for hydraulic conveyor production must meet the requirements of regulatory documents specified in Subsection 3.4, certificates and ensure the service life and reliability in the ambient conditions specified in Subsection 3.1.

3.10.2 The materials used must be tried out and approved in the industry and comply with technical characteristics set forth in applicable standards. The combination of various types of materials within the same equipment must be minimized.

3.10.3 Material used for manufacture of the equipment must not preclude equipment inspection and testing during its production and throughout its service life.

3.10.4 The quality of the materials and components must be certified.

3.10.5 The materials which are dangerous and hazardous for human being as well as the materials producing toxic substances under fire must not be used.

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3.10.6 Use of copper-containing materials for production the equipment assemblies which are in contact with the pumped medium is avoided.

3.10.7 Locations where stainless steel parts contact carbon steel parts must be protected with anti-corrosion deposit welding.

3.10.8 The hydraulic conveyor surfaces must be resistant to environmental impact and be painted according to the instructions given in the drawings. Paint coating must protect the hydraulic conveyor from corrosion and any degradation during transportation, storage and warranty period. The class of paint coating is determined by the equipment manufacturer according to the conditions of transportation, storage and operation.

The used paints must be certificated by ÉMI Építésügyi Minőségellenőrző Innovációs Nonprofit Kft.(Non-profit Limited Liability Company for Quality Control and Innovation in Building).

Surface preparation before painting must be performed according to MSZ EN ISO 8501.

3.10.9 Material characteristics must not degrade while the equipment is stored at the manufacturer's premises, transported, stored at the NPP site during the warranty period, which includes testing or commissioning.

3.10.10 Welding materials must comply with the requirements of the current standards and specifications for their manufacturing and delivery and must have quality certificates. The scope and methods of welds control must be given in the drawings.

3.10.11 Equipment documentation must contain explanations regarding material selection and equipment protection against stand still corrosion..

3.10.12 Materials and surface coating of the hydraulic conveyor must withstand loads during operation under design conditions. While choosing the materials it is necessary to confirm that corrosion, erosion, radiation and other harmful factors do not affect operation of the hydraulic conveyor.

3.10.13 The used materials including protective coating must be corrosion/erosion-resistant and wear-resistant to the environment and external impacts including decontamination solutions. The materials must minimize accumulation of corrosion products.

3.10.14 The minimum corrosion allowance for equipment wall thickness must be 1 mm for ferritic steel or another value according to the applied standard if this value exceeds 1 mm.

3.10.15 Internal liners or gaskets, coatings or linings of equipment must be such as to withstand all design conditions during the NPP service life, or must be easily repaired.

The used materials are industrially tested and well-proven at the NPPs.

3.10.16 Materials of the equipment must not produce toxic substances.

3.10.17 The use of polyetheretherketone is not allowed.

3.10.18 The applied materials must be corrosion-resistant and wear-resistant in relation to the routine lighting environment and external impacts. As required, the internal and external surfaces of the equipment must be covered with anti-corrosion coating.

3.10.19 The supplied materials and items for hydraulic conveyor production must be certified by the Supplier according to the requirements of standards and specifications.

3.10.20 Fasteners (bolts, studs, nuts) for the flanged connections must be made of materials of the same class as the connected parts are made of. It is possible to use the fasteners made of materials of various classes. In this case reliability of the connections must be proved by calculations or must be tested.

3.10.21 Materials and semi-finished products must be securely protected against damage during transportation and storage. Materials of different grades (austenitic and perlitic steel grades, etc.) must be transported and stored under the conditions preventing their contact.

3.10.22 Methods for protecting the materials and semi-finished products during transportation and storage must be developed by the manufacturing company. The requirements for

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transportation and storage conditions must be specified in the standards or technical specifications for delivery and strictly adhered to.

3.10.23 The Supplier must consider compatibility of the applied materials with the full range of environmental conditions that may be encountered during the NPP operation. In particular, this applies to non-metallic materials. Information about the environmental conditions (temperature, humidity, radiation) under which the materials were sampled is recorded in the relevant documentation.

3.10.24 Materials that are dangerous for personnel, NPP operation or the environment (e.g. insulation materials, etc.) must only be used if a satisfactory alternative solution is not available. If the use of hazardous materials is unavoidable, the Supplier must determine how to ship, store, handle and use this material in order to minimize hazardous factors, taking into account the applied EU directives and national standards. When using hazardous materials for the NPP construction and operation, it is necessary to take into account the associated environmental consequences.

3.10.25 Only Manufacturers approved by the Owner can produce materials.

3.10.26 If materials are produced according to specifications that are not approved or certified according to the globally recognized standards (e.g., RCC-M, ASME), the material Manufacturer must provide the relevant substantiation. Substantiation must be based on a risk analysis and provide evidence that the chosen materials are of the same safety class as the approved materials.

3.10.27 Composite materials can be used in some cases: substantiation of their use, availability of the approved design analysis, submission of the test results evidence of their compliance with the requirements for materials presented in this subsection. The use of composite materials must be approved by the Owner.

3.10.28 The material requirements are presented in DRDS.

3.11 Requirements for electrical equipment

Requirements of electric equipment of the hydraulic conveyor are not specified.

3.12 Requirements for equipment instrumentation and automation

3.12.1 Instrumentation and automation requirements

3.12.2 No metrological requirements are specified.

3.13 Requirements for repairability

3.13.1 The equipment must be repairable, inspectable and maintainable in situ. The repairability, ease of maintenance and documentation on maintenance and repair must comply with the applicable standards (e.g. MSZ EN 60706-2).

3.13.2 Design of the hydraulic conveyor must allow using universal fitting tools and accessories for maintenance and repair as well as special-purpose tools and accessories supplied as part of the pump set.

Removable assembly units and parts of mechanisms must be fastened by standard fasteners.

3.13.3 The repair documentation for the equipment must contain the slinging diagram of large-size components, as required, with its weight and the gravity centre and other information providing safe lifting and transportation. Design of the equipment must allow its slinging during installation.

3.13.4 The equipment must be designed to provide performance of all types of maintenance and repair with the use of mechanical equipment according with the requirements of the supplied repair documentation.

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3.13.5 The scope and types of maintenance and repair work must be specified in the repair documentation within the equipment delivery set.

3.13.6 The equipment Developer must specify reparability requirements for the items in the TA/TS during design process.

3.13.7 The equipment must comply with these technical specifications, requirements laid down in the data sheets and requirements of effective regulatory documents according to Subsection 3.4 in these technical specifications.

3.13.8 If other regulatory documents are used, including Russian regulatory documents that govern the use of nuclear energy, the equipment Suppliers must obtain the Owner's approval of a procedure for application of such documents.

3.13.9 The requirements for quality control, testing, acceptance and supply are determined by the requirements for the quality of manufacture and the conditions of the supply contract.

3.14 Conformity assessment

3.14.1 The equipment must comply with these technical specifications, requirements laid down in the data sheets and requirements of effective regulatory documents according to Subsection 3.4 in these technical specifications.

3.14.2 If other regulatory documents are used, including Russian regulatory documents that govern the use of nuclear energy, the equipment Suppliers must obtain the Owner's approval of a procedure for application of such documents.

3.14.3 Development and approval of quality plans, as well provision of inspections during the equipment production and supply are performed according to procedure PAKSII-PMM-12.0.05 "The order of inspections during manufacturing and supply of products for civil objects."

3.15 Quality assurance

3.15.1 The equipment design and production process must comply with the quality management requirements specified by the Owner in the relevant supply contracts. The scope of quality management requirements is based on the differentiated approach to quality assurance according to safety class of the equipment and quality assurance category.

3.15.2 3.15.2 Quality assurance category (QA) of the equipment is assigned in accordance with PKS2.P.P000.&.&&&&&&&&&&.089.YH.0001.E "Classification of quality assurance categories" and is specified in the Design requirements data sheets..

3.15.3 In order to prevent the use of any infringing or falsified product for equipment production, an enterprise must take measures to detect, manage, control, report and eliminate such products.

3.15.4 The enterprise material base must have the equipment and infrastructure that allow production of products with specified parameters and characteristics.

3.16 Requirements for power consumption, power saving and power efficiency

3.16.1 Requirements for power consumption, power saving and efficiency are not specified.

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4 Special requirements

4.1 Certification requirements

4.1.1 Certification requirements are indicated in the relevant sections and/or appendices to the Supply Contract.

4.2 Marking requirements

4.2.1 The Supplier (Manufacturer) must specify measures to identify and keep track of the equipment and its components (parts, assembly units, etc.). For this purpose, the equipment (product), all parts and assembly units within the equipment must be marked and provided with accompanying documentation providing their identity and control at all stages of their life cycle and confirming compliance with the relevant process requirements and regulatory documentation.

4.2.2 The marking requirements are specified in relevant sections and/or appendices to the Supply Contract.

4.2.3 The product to be shipped must have a data plate in Hungarian. Each data plate must contain, at least, the following data written by black letters not less than 5 mm high on a bright background:

- name, type, serial number, safety class and seismic category that allow one to most definitely identify the equipment;
- the most important technical data that characterize this equipment (for example, performance, weight, etc. in SI units);
- name and address of the manufacturer; year of production;
- KKS code.

4.2.4 The data plate must be securely fastened to prevent removal on site and be well visible, readable and cleanable.

4.2.5 An individual KKS code (functional designation) is to be assigned to the equipment according to these technical specifications. The marking of the functional designation is to be additionally agreed on according to the terms of the Supply Contract.

4.2.6 Painting colours must comply with the requirements of ISO 3864 "Graphical Symbols. Signalling colours and safety signs".

4.2.7 The equipment must be provided with a "CE" mark according to requirements specified in the Directives of the European Parliament and the Council of the European Union.

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5 Environmental requirements

5.1 The equipment must be manufactured and transported to the place of operation according to the requirements of MSZ EN ISO 14001 "Environmental Management Systems. Requirements with guidance for use" and Hungarian environmental laws.

5.2 The equipment must be designed and manufactured according to the requirements for the factors of production that are physically, chemically and biologically hazardous and harmful to the environment.

The equipment is designed to reduce the environmental impacts up to the values which do not exceed the values specified by the current regulatory documents:

During equipment designing, it is necessary to determine the environmental conditions and the external and internal hazards for the operating modes specified in section 3.2.

5.3 Throughout installation, operation, repair and dismantling the equipment must not affect the environment, which is achieved by zero leaks of lubricating fluids and zero release of gaseous substances during operation and parking.

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6 Requirements for information to be provided

6.1 Requirements for technical assignment

6.1.1 Documentation for the tank is to be submitted as part of a full set of design, installation, commissioning, operational and repair documents according to the requirements of the regulatory documentation specified in items 3.4, 3.6. The submitted documents are as follows:

6.1.1.1 Documentation that is the initial design data:

Requirements for the provided documentation, containing the initial design data, are specified in section 6.3.

6.1.1.2 Documentation to be supplied together with the equipment:

6.1.1.2.1 TA / TS;

6.1.1.2.2 drawing with all connection and installation dimensions and weights indicated;

6.1.1.2.3 specification;

6.1.1.2.4 installation drawings;

6.1.1.2.5 documentation on quality assurance at all stages of manufacturing;

6.1.1.2.6 quality control tables for the base materials and welds;

6.1.1.2.7 diagram of welded joints;

6.1.1.2.8 equipment test reports and certificates;

6.1.1.2.9 certificates for equipment and materials used;

6.1.1.2.10 preservation instructions;

6.1.1.2.11 equipment connection diagrams, connection to power supply, connection of auxiliary systems, data on split-design components;

6.1.1.2.12 operational documents according to MSZ EN ISO 12100 "Safety of Machinery. General principles for design. Risk assessment and risk reduction", including:

- operation manual;

- data sheet, including technical documentation for parts and Sub-suppliers' components (data sheets, manufacture certificates and conformity certificates) integral to the equipment;

- manual for installation, start-up, calibration and trial run;

- special operation instructions;

- list of operation documents;

- documentation for devices and accessories to be installed in hydro-conveyor body to conduct hydraulic testing

6.1.1.3 Technical documentation for maintenance and repair compliant with MSZ EN 13460 "Maintenance. Documentation" and as per the supply contract, namely:

- maintenance manual;

- set of process documentation on works to be performed during scheduled maintenance and repair;

- list of spare parts;

- usage rates for spare parts and materials;

- assembly drawings, detailed drawings of parts with a service life shorter than the equipment service life;

- design documentation for assembly/disassembly;

- diagrams (hydraulic, pneumatic, etc.);

- technical documentation on repair tools delivered complete with the item (including operation manual);

- list of repair documents;

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6.1.2 The TA/TS approval process must run in observance of the Regulation for cooperation during TA / TS approval. The Regulation will be submitted to the Supplier upon request at the stage of bidding procedure and / or at the stage of signing the Supply Contract.

6.1.3 TA/TS must not contain any copies of documents (or their parts) for which the Supplier does not have intellectual property rights.

6.1.4 Technical assignments must contain the requirements for equipment certification.

6.1.5 The equipment developer must provide the documentation listed in Section 6.3 in Russian and English. All other documentation is to be provided as required by the Supply Contract.

6.2 Requirements for the scope and content of the Basic Design

6.2.1 The requirements do not apply.

6.3 Requirements for design engineering documentation

6.3.1 The Supplier must provide the Customer with relevant initial data on products needed for the implementation of the NPP design in terms of civil engineering, ventilation, electricity, automation and fire safety.

The format of submission of initial data, their detailed contents, stages and dates of submission are specified in the Supply Contract for equipment are to be detailed in the TA (for new equipment).

6.3.2 Reliable initial data for the equipment must be issued to the Customer according to the schedule of the equipment Supply Contract. The input data include the following:

- data for design of the civil engineering part;
- data for design of fire protection measures;
- data for automatics designing;
- data on noise level and vibration caused by the equipment being designed;
- data on the quantity of maintenance personnel;

6.3.3 The Supplier (Manufacturer) must provide the following initial data:

6.3.3.1 TA/TS containing, among others:

- outline drawings of the equipment with limit dimensions and connection dimensions;
- technical characteristics of the equipment;
- material specification;
- data on fire-load from the equipment;
- assignment for equipment installation, with static and dynamic loads specified;
- requirements for free space for maintenance and installation;

The main stages of the documents development and approval must be specified in the technical assignment.

6.3.3.2 Assembly drawing that contains, among others:

- equipment KKS code and facility reference;
- all necessary connection and outline dimensions, which are to be indicated according to the actual size of the equipment; dimensions within branch pipe and nozzle outreach must be shown. The dimensions must, whenever possible, be indicated with reference to the same base (housing axis, fixed support); branch pipe edge preparation for welding must be shown in separate sketches in the drawing;

- table of branch pipes (connection pipes) with the indication of branch pipe alphabetical designations, the purpose of each branch pipe (pumped fluid inlet, pumped fluid outlet, etc.), nominal diameters, other required dimensions, reference to the document based on which the edges of the branch pipes are prepared for welding;

- table of permissible loads on branch pipes (approved by the Customer);
- table of technical characteristics with the indication of equipment model and mass;
- loads on the foundation;

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- the point where the equipment support frame is attached to the foundation.

6.3.3.3 hydraulic diagrams of the equipment showing characteristics of the supplied/discharged fluids and connection interfaces, hydrostatic test pressure, water temperature for hydraulic tests.

6.3.3.4 To design labour-saving machinery for maintenance and repair of the equipment, the following initial design data must be provided:

- weight, dimensions and gravity centers of components to be disassembled during maintenance and repair;
- slinging diagrams showing a distance from the bottom of slung equipment up to the hook and points where slings must be attached;
- dismantling dimensions of the equipment;
- drawings of special devices for mounting / disassembling equipment (for example a cross-beam) when delivered complete with equipment.

6.3.3.5 3D-model of the equipment.

The 3D model must be executed in the ".sat" format. The model must be integral and must not contain component parts (i.e. must be implemented as a single 3D body). The model scale must be 1:1. Size of the 3D model file must not exceed 5 MB, if possible. Central point must belong to the model.

The equipment 3D-model must be submitted by the Designer within the terms specified by the supply contract.

The equipment model must be developed according to the following:

- overall dimensions;
- installation dimensions.
- connection dimensions.

The counter flanges must be shown in the 3D model, but shipping plugs must not.

If the equipment requires a service area, it is necessary to specify the minimum service area in a separate sat-file in the form of a skeleton model.

6.3.4 The drawings are to be submitted for approval in the ".pdf " electronic format (Acrobat Reader) along with their copies in the ".dwg", ".dxf" or ".dgn". formats. Drawings must be clear and "readable"; the lines must not merge.

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7 Requirements for novelty

7.1 Requirements for the outcome of intellectual activity, patent novelty and confidentiality correspond to the requirements laid down in the Supply Contract.

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8 Identification codes

8.1 "KKS Application User's Manual for Paks II NPP" PKS2.C.P000.&&&&&.KKS&&&.089.YV.0001 is applied at the Paks II NPP Project [2].

8.2 The KKS codes of the equipment are:

- 50LDP50AP001;
- 60LDP50AP001.

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9 Requirements for complete set

9.1 The hydraulic conveyor must be supplied according to the main design document (specification) including assembly units providing that the hydraulic conveyor performs their functions in operating mode according to item 3.2 of the Technical Specifications and Table 1.

Table 1 – Specification of the equipment delivery set

Equipment	Q-ty	Notes
1 Pre-assembled hydraulic conveyor in accordance with the main design documentation (specification), including:		Technical characteristics are given in DRDS of these technical specifications.
1.2 Set of flanges, shut-off valves and quick couplings	Set 2	
1.3 Flexible hoses with quick couplings	pcs. 2	Total length is 25 meters.
2 Other:		
2.1 Set of spare parts and easy-wear parts for the period of installation, pre-commissioning, NPP commissioning and warranty operation period of the Power Units;	Set 1	
3. Technical documentation:		
3.1 Specification (technical assignment and / or technical specification and / or technical requirements)	Set 1	
3.2 Assembly drawings (final revisions) and assembly drawings of the components (for equipment transportation)	Set 1	
3.3 Set of technical and shipping documentation according to Section 6 of these technical specifications.	Set 1	

9.2 The supplied items and materials of the delivery set must meet the norms, standards and other regulatory documents applied in the project.

9.3 The equipment Designer specifies the required sets for the periods of pre-commissioning works, NPP commissioning, for the warranty period of NPP operation. The sets must then be approved by the Customer at the stage of TA/TS approval.

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10 Requirements for packaging, transportation and storage

10.1 The requirements for packaging, transportation, and storage of the equipment are specified in the relevant sections and/or appendices to the Supply Contract.

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11 Acceptance requirements

11.1 The delivery time and procedure of product handover to the Owner are specified in the Supply Contract.

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12 Requirements for the amount and/or duration of guarantees

12.1 Requirements for the amount and duration of warranty liabilities are determined in the Supply Contract.

12.2 The warranty liabilities must be specified in the TA/TS.

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13 Requirements for installation, adjustment and maintenance

13.1 All necessary and sufficient information on maintenance, adjustment and operation must be contained in the set of operation documentation supplied with the equipment. The Owner (operating organization) requirements for installation, supervising installation, commissioning, supervision commissioning, maintenance, technical support during operation to the equipment Supplier are specified by the supply contract.

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14 Requirements for technical training of the Owner's personnel

14.1 The Owner's (operating organization) requirements to the equipment Supplier for training of the Owner's personnel during equipment delivery are specified by the Supply Contract. General requirements for training and certification of personnel to be authorized for equipment operation, maintenance and repair must be specified in TA/TS.

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List of abbreviations

- I&C** - Instrumentation and control
- KKS code** - KKS coding system (Kraftwerk Kennzeichen System)
- NPP** - Nuclear Power Plant
- SAR** - Safety analysis report
- TA** - Technical Assignment
- TS** - Technical specification

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References

The main regulatory documents are listed in the table "List of regulatory documents" (PKS2.B.N000.5.0ULR&&&&&&&.023.SG.0010.E-MZY0001).

- [1] PKS2.P.P000.&&&&&&&.089.YH.0001 "Classification of Quality Assurance Categories".
- [2] PKS2.C.P000.&&&&&&&.KKS&&&.089.YV.0001 "KKS application User's Manual for Paks II NPP"

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Опросный лист проектной потребности / Design Requirements Data Sheet			
<i>Код проектной позиции / Design Item Code</i>		50LDP50AP001, 60LDP50AP001	
<i>Код документа / Document Code</i>		50LDP50AP001-MYM0001	
<i>Тип оборудования / Type of Equipment</i> ГИДРОТРАНСПОРТЕР / HYDRAULIC CONVEYOR			
<i>Наименование оборудования / Description of Equipment</i> Гидротранспортер для загрузки ионообменных смол / Hydraulic conveyor of ion exchange resins			
<i>Разработчик организация / Developed by Company</i> JSC ASE EC; IDB-1/3			
<i>Разработчик отдел / Developed by Department</i> АО ИК АСЭ; БКП-1/3			
	Поля заполняются проектировщиком / Fields to be filled by the Designer	Ревизия / Revision	B01
	Поля заполняются разработчиком оборудования / Fields to be filled by the Equipment Designer	Дата / Date	
	Поля могут заполняться проектировщиком и уточняться разработчиком / Fields can be filled by the Designer and specified by the Developer	№ разрешения изм. / Change Authorization No	
<i>№/No</i>	<i>s</i>	<i>Наименование показателя / Parameter Description</i>	<i>Значение / Value</i> <i>Ед. изм.* / UoM*</i>
1		Сведения об объекте / Project Details	
1.1		Объект / Project	АЭС Пакш-2 / NPP Paks-2
1.2		Блок / Unit	5
1.3		Здание / Building	50ULR
1.4		Отметка / Elevation	+8,400 50ULR08
1.5		Помещение / Room	50ULR08R313
1.6		Система / System	50LDP
2		Нормативная база и классификация / Normative Base and Classification	
2.1		Класс безопасности / Safety Class	4
2.2		Классификационное обозначение / Classification designation	-
2.3		Категория сейсмостойкости / Seismic stability category	40BE
2.4		Категория обеспечения качества / Quality assurance category	QNC
2.5		Группа оборудования / Equipment group	-
3		Характеристики места установки и исполнение в части воздействия климатических факторов / Location Features and Version Pertaining to Climatic Exposure	
3.1		Тип атмосферы на объекте применения** / Type of atmosphere at the project**	3K3/3Z1/3B1/3C1L/3S2/3M1
3.2		Климатическое исполнение / Climatic version	Temperate
3.3		Категория помещения по пожаро-взрывоопасности*** / Fire and explosion hazard related category of premises***	МК
3.4		Категория помещения / Room category	Зона свободного доступа / Free access area

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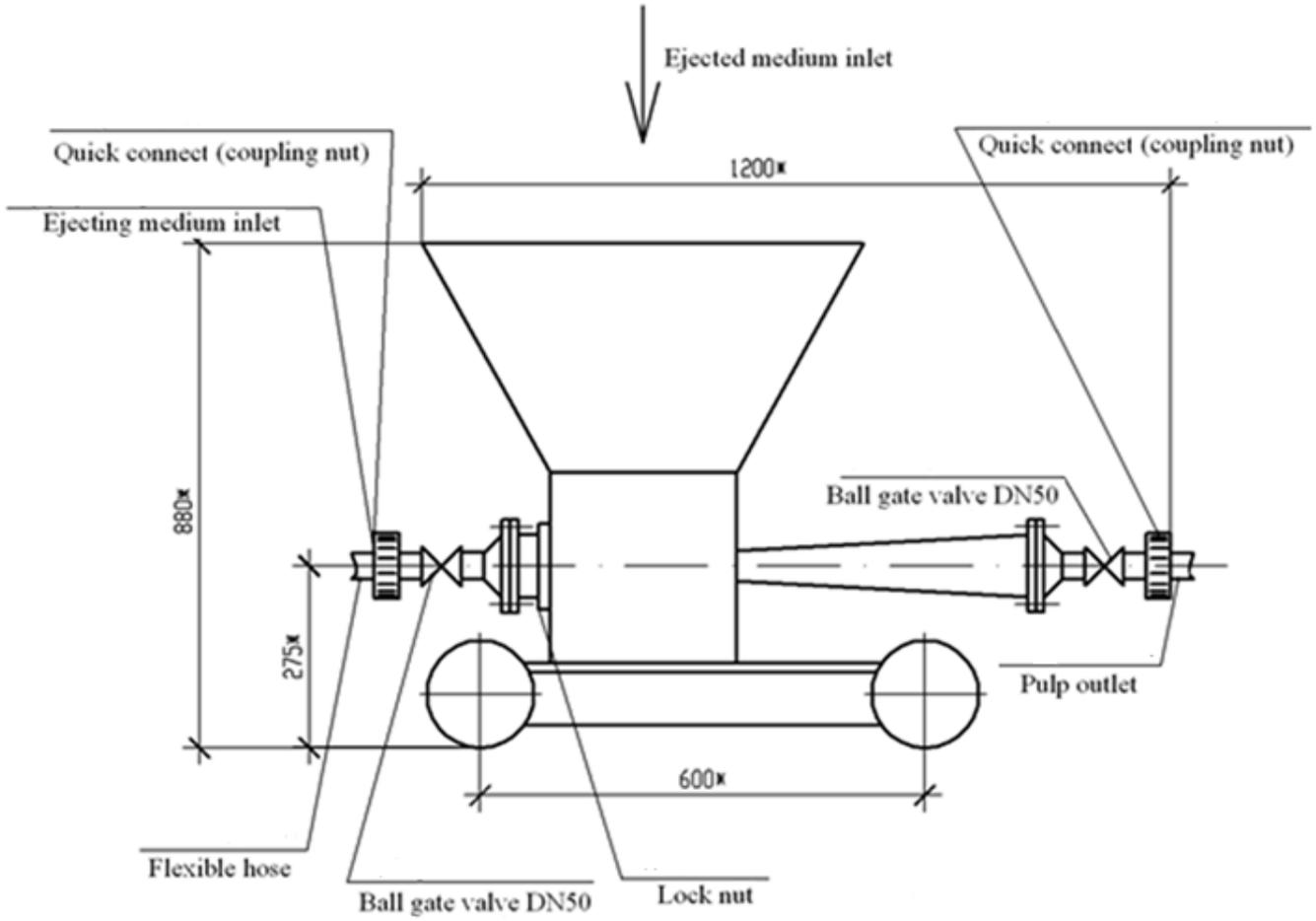
4				Параметры перекачиваемой среды / Fluid to Be Pumped Parameters			
4.1		Основная перекачиваемая среда / Main fluid to be pumped	Тип / Type	Технологическая среда / Process			
4.2			Среда / Fluid	Пульпа ионообменных смол конденсатоочистки / Ion exchange resin pulp of CPP			
4.3		Температура перекачиваемой среды / Temperature of the fluid to be pumped	Min	25	C		
4.4			Max	25	C		
4.5		Максимальная плотность перекачиваемой среды / Ultimate density of the fluid to be pumped		1200	kg/m ³		
4.6		Водородный показатель, pH / Hydrogen index, pH	Min				
4.7			Max				
4.8		Альтернативная перекачиваемая среда / Alternative fluid to be pumped	Тип / Type	Вода / Water			
4.9			Среда / Fluid	Обессоленная вода / Demineralized water			
4.10		Примечания (Параметры перекачиваемой среды) / Notes (Fluid to Be Pumped Parameters)					
5				Основные проектные параметры и характеристики / Main Design Parameters and Characteristics			
5.1		Рабочее давление / Operating pressure		1.1	MPag		
5.2		Производительность (расход загрузки) / Capacity (rate of loading)		4	m ³ /h		
5.3		Гидросмесь / Hydromixture	Скорость движения / Rate of motion				
5.4			Расход / Flowrate				
5.5		Гидравлическое сопротивление / Hydraulic resistance					
5.6		Массовый расход эжектирующей среды / Mass flow rate of ejecting fluid		20	ton/h		
5.7		Давление эжектирующей среды на входе / Ejecting fluid pressure at the inlet		0.6	MPag		
5.8		Давление среды на выходе (пульпа) / Fluid pressure at the outlet (pulp)		0.55	MPag		
5.9		Фракция сорбента / Sorbent fraction	Min	0.3	mm		
5.10			Max	1.25	mm		
5.11		Насыпная плотность сорбента / Sorbent apparent density	Min	650	kg/m ³		
5.12			Max	850	kg/m ³		
5.13		Емкость бункера / Hopper volume		0.1	m ³		
5.16		Примечания / Notes					

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Материал / Material.....Сборный / Composite				
6	Массагабаритные характеристики / Weight and Size Parameters			
6.1	Масса, не более / Weight, not more than	Нетто / Net	150	kg
6.2		Брутто / Gross		
6.3	Максимальные габаритные размеры, не более / Maximum overall dimensions, not more than	Высота / Height	880	m
6.4		Ширина / Width	826	m
6.5		Длина / Length	1400	m
7	Показатели надёжности / Reliability Factors			
7.1	Срок службы, не менее / Service life, not less than		60	s
7.2	Среднее время до восстановления, не менее / Mean time to recovery, not less than		120	s
7.3	Средний ресурс до капитального ремонта, не менее / Mean operation life to overhaul stage, not less than		8	s
7.4	Средняя наработка между отказами, не менее / Mean time between failures, not less than		16000	s
7.5	Примечания (Показатели надёжности) / Notes (Reliability Factors)			
8	Примечания / Notes			
8.1	* Единицы измерений для числовых значений физических величин / * Units of measurement for numerical values of physical quantities			
	** В соответствии с MSZ EN 60721-3-3 / In accordance with MSZ EN 60721-3-3			
8.2	*** Распоряжением министра внутренних дел № 54/2014. (XII. 5.) «О национальном уставе пожарной безопасности» / *** As per Decree 54/2014 (XII. 5.) BM of the Minister of the Interior on the National Fire Protection Regulations			
8.3	Примечания / Notes			
Условный диаметр гибкого рукава / Flexible hose DN50 мм / mm				
Условный диаметр присоединительных фланцев / inlet connections DN.....50 мм / mm				

Orig. arch. Nr. PKS-04365 мм / Replace arch Nr. PKS-01033 мм

OVERALL DIMENSIONS



Orig. arch. Nr. PKS-04365 mm / Replace arch Nr. PKS-01033 mm

50ULR-MMD0028	Overall dimensions	1
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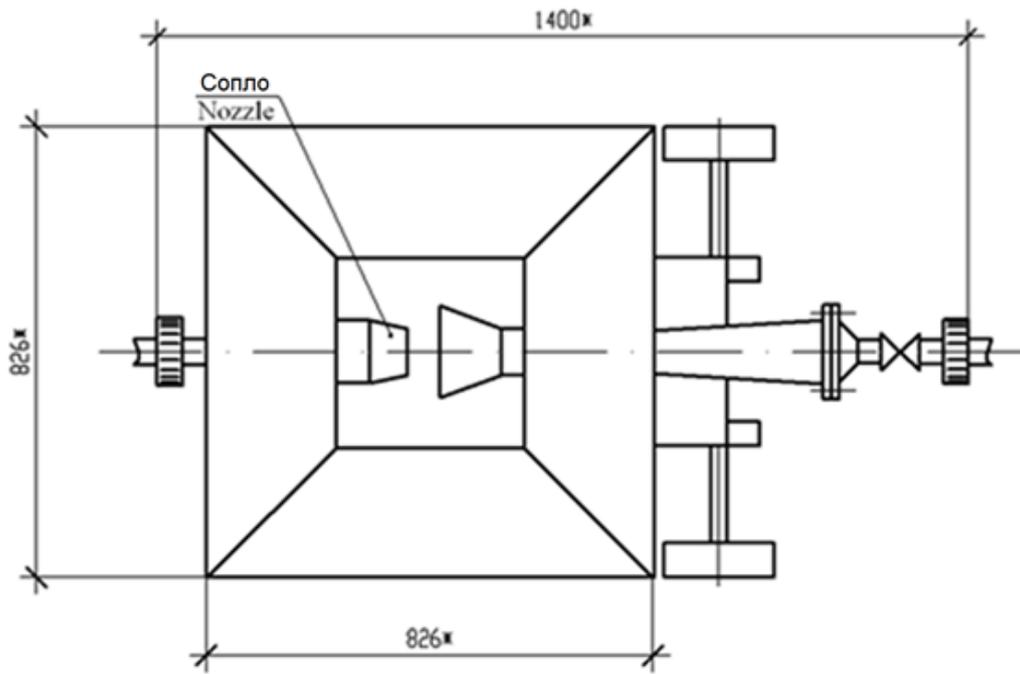


Figure 1 – Hydraulic conveyor (50LDP50AP001, 60LDP50AP001)

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50ULR-MMD0028	Overall dimensions	2
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REVISION SHEET

Rev.	Number of sheets				Total number of sheets (pages) in the document	Document number	Signature	Date
	Changed	Replaced	New	cancelled				
B02	-	All	-	-	45	131-21 dd. 02.02.2021		17.02. 2021

Orig. arch. Nr. PKS-04365 nm / Replace arch Nr. PKS-01033 nm