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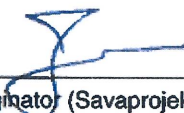






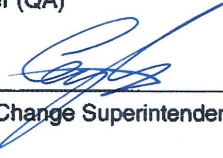
Technical Specification OSC, FILTER PLENUM FANS

KRŠKO NUCLEAR POWER PLANT

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Aleksandar Jovanović		22.2.2018
	Originator (Savaprojekt)	Date
Vladimir Butković		24.02.2018
	Reviewer	Date
Boštjan Pevec		26.2.2018
	Reviewer	Date
Ronan Krajnc		1.3.2018
	Reviewer	Date
Ivan Učanjšek		25.03.2018
	Reviewer	Date
Jože Kerin		05.03.2018
	Reviewer	Date
Romeo Bišćan		05.03.2018
	Reviewer (QA)	Date
Janko Cerjak		06/03/2018
	Engineering and Design Change Superintendent	Date



NUCLEAR POWER PLANT KRŠKO

Project Modification 1056-NA-L

**NEK SAFETY UPGRADE PROJECT – Design and Engineering
for modification 1056-NA-L “Reconstruction of Operational
Support Center (OSC)”**

**TECHNICAL SPECIFICATION
OSC, FILTER PLENUM FANS
(Rev. 5)**

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	Name	Signature	Date
Prepared by:	Aleksandar Jovanović		22.2.2018
Reviewed by (Mechanical):	Urban Žigante		22.2.2018
Reviewed by (Electrical, I&C):	Damjan Mežič		22.2.2018
Reviewed by (QA):	Tatjana Vresk		22.02.2018
Approved by:	Goran Šalamon		22.02.2018

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1	15.2.2017	Revision correction previously given by the investor	---
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2	9.3.2017	Revision correction previously given by the investor	---
3	28.4.2017	Revision correction previously given by the investor	---
4	11.9.2017	Revision correction previously given by the investor (3.4.2017 and 26.7.2017)	---
5	08.02.2018	Consideration of corrections suggested during technical dialog performed by investor.	---

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Attachment 1: Fan Performance Data List forms (2 pages)

Attachment 2: Applicable Floor Response Spectra Figures from the Appendices A and B of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1 (4 pages)

Attachment 3: BIDDER'S Equipment Specification Exceptions form (1 page)

Attachment 4: Equipment Data List form (2 pages)

Attachment 5: Vendor Technical Manual Guideline (1 page)

Attachment 6: MECL Data Tables (2 pages)

1 SCOPE

1.1 Scope of Work

This Specification includes the information required for the procurement of filter plenum fans for the Operational Support Center (OSC) air cleaning / air conditioning ventilation system in the Krško Nuclear Power Plant (NEK). Specification is classified as Non Safety Related (NSR), however Augmented Quality (AQ), Seismic Category I. Electrical components are classified as Non Class 1E (NSR).

1.2 Equipment, Material, and Services to be Furnished by the SUPPLIER

The equipment, material, accessories, and services to be furnished by the SUPPLIER shall include, but are not necessarily limited to, the following:

1. Two standalone (not unhoused) centrifugal fans with motors, V-belt drive and fan accessories as required, with capacity, size and drive arrangement as indicated in this Specification and in the Fan Performance Data List.
2. Inlet transition box.
3. Electrically operated and controlled inlet damper with linkage and AC electric actuator. The electric actuator shall be 230V/1 phase/50Hz spring return type controlled with an input control signal of 4 – 20 mA DC. The actuator shall be spring opposed to open vanes (fail open) on loss of electrical power supply or control signal.
4. Expansion joints at inlet of the inlet box damper and at fan discharge.
5. One set of all special tools required for the operation and maintenance of equipment to be furnished.
6. Performance of all necessary factory acceptance tests.
7. Packaging and preparation for shipment.

1.3 Equipment, Material, and Services to be Furnished by OTHERS

The following equipment, material, and services are not a part of this Contract and will be furnished by OTHERS:

1. Receiving, unloading and erection of the fans at the JOBSITE.
2. Foundations and anchor bolts.
3. Ductwork connections.
4. Electrical power supply and external wiring to the fans.

2 DEFINITIONS

AC	Alternate current
AQ	Augmented Quality
BIDDER	An entity, which offers supply of products and/or services and has submitted a bid within a public tendering procedure
DC	Direct current
DEC	Design Extension Conditions
EMI	Electromagnetic Interference
EQ	Environmental Qualification
JOBSITE	Installation location of equipment at the Nuclear Power Plant Krško site
MECL	Master Equipment Component List
NCN	Nonconformance Notice
NCR	Nonconformance Report
NEK	Nuclear Power Plant Krško
NRC	United States Nuclear Regulatory Commission
NSR	Non Safety Related
OBE	Operating Basis Earthquake
OSC	Operational Support Center
OTHERS	NEK or other company(ies) subcontracted by NEK
PURCHASER	Nuclear Power Plant Krško
QA	Quality Assurance
RFI	Radiofrequency Interference
SSE	Safety Shutdown Earthquake
SWC	Surge Withstand Capability
SUPPLIER	An entity, which supplies equipment and/or services to NEK per this Specification

3 CODES, STANDARDS AND REGULATORY REQUIREMENTS

Fans covered by this Specification are classified as Non Safety Related (NSR), however Augmented Quality (AQ) Seismic Category I. Electrical components are classified as Non Class 1E (NSR). They shall be designed, manufactured, tested, and certified in accordance with the applicable latest versions of the applicable codes and standards:

1. American Bearing Manufacturers Association (ABMA):
 - a. ABMA 9, Load Ratings and Fatigue Life for Ball Bearings;
 - b. ABMA 11, Load Ratings and Fatigue Life for Roller Bearings;
2. Air Moving and Conditioning Association (AMCA)
 - a. AMCA 99, Standards Handbook;
 - b. AMCA 204, Balance Quality and Vibration Levels for Fans;
 - c. AMCA 210, Laboratory Methods of Testing Fans for Rating Purposes;
 - d. AMCA 300, Reverberant Room Method for Sound Testing of Fans;
3. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):
 - a. Standard 68, Method of Testing In-Duct Sound Power Measurement Procedure for Fans;
4. American Society of Mechanical Engineers (ASME):
 - a. AG-1-2015, Code on Nuclear Air and Gas Treatment;
 - b. NQA-1, 2008 with 2009/2011 Addenda, Quality Assurance Program Requirements for Nuclear Facility Applications;
5. American Welding Society (AWS):
 - a. AWS D1.1, Structural Welding Code for Steel;
6. Electric Power Research Institute (EPRI)
 - a. EPRI TR-102323, Rev. 4, Guidelines for Electromagnetic Interference Testing in Power Plants;
7. International Electrotechnical Commission (IEC):
 - a. IEC 61000, Electromagnetic Compatibility (EMC), Part 3 - Limits and Part 4 - Testing and Measurement Techniques;
8. Institute of Electrical and Electronics Engineers (IEEE):
 - a. IEEE 1050-2004, IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations;
9. NRC Regulatory Guides:
 - a. RG 1.29, Seismic Design Classification, Rev. 1, August 1973;
 - b. RG 1.52 Rev.3, Design, Testing, and Maintenance Criteria for Post-Accident Engineered Safety Feature Atmosphere Clean-up System Air Filtration and

Adsorption Units of Light Water Cooled Nuclear Power Plants, Rev. 4, September 2012;

- c. RG 1.100, Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants, Rev. 3, September 2009;
- d. RG 1.180, Guidelines for evaluating electromagnetic and radio-frequency interference in SR instrumentation and control systems, Rev. 1, October 2003;

10. US Military Standards (MIL):

- a. MIL-STD-461E, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment;

Unless stated otherwise by the PURCHASER, the SUPPLIER shall use the appropriate codes and a standard listed in this section in effect at the time of Purchase Order issued by the PURCHASER.

The SUPPLIER shall submit criteria for the design and fabrication of equipment not covered by codes given above to PURCHASER for review and approval.

4 SUPPLEMENTAL DATA

Items listed below are hereby made a part of this Specification. Where a conflict exists between supplemental data and this Specification, this Specification shall take precedence.

Supplemental data items:

1. QS-610, Rev. 1, Generic Quality Assurance Program Requirements;
2. SP-A5001, Rev. 0, Technical Specification Service Level III Coatings;
3. SP-A5002, Rev. 0, Coatings for Internal Surfaces of ECR HVAC System;
4. SP-E311, Rev. 2, Non-Safety Related Fractional Horsepower and Larger Electric Motors;
5. SP-S702, Rev. 10, Seismic Analysis, Testing and Documentation;

NOTE: The specification SP-S702 is provided without Appendices with floor response spectra figures. Applicable flow response spectra figures are provided in the Attachment 2.

6. Document No. OSC Seismic Analysis, 1056-NA-L-PZI-3/1-A1;

NOTE: The OSC Applicable OBE and SSE Floor Response Spectra Figures are taken from the Appendices A and B of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1 and provided in the Attachment 2.

5 DOCUMENT SUBMITTAL

5.1 General

All documents (including drawings, graphs, specifications, etc.) submitted shall be in the form of hard copies and electronic media. Acceptable document format sizes shall be A2 or smaller, A3 and A4 should be used whenever possible.

Preferred format for electronic correspondence is Adobe Acrobat Reader (pdf). Other acceptable formats shall be:

- Word Processing: Microsoft WORD (doc, docx);
- Spreadsheet: Microsoft EXCEL (xls,xlsx); and
- Computer Aided Drafting: AutoCAD (dwg).

All SUPPLIER's documents shall bear at least the following information:

- SUPPLIER's Name;
- Date of issue;
- Document status;
- Document number;
- Revision number;
- Construction Code or Standard;
- Other organizations participating in the manufacturing;
- NEK Purchase Order number; and
- NEK Specification number.

5.2 Information Required with the Proposal

The BIDDER shall submit complete operating data and description of the equipment offered with the Proposal. This data shall include the following:

1. General description of proposed equipment with operating characteristics of components (motors, bearings, belts, inlet box, inlet box damper, etc.).
2. Preliminary outline drawings of the fan assembly, clearly marked with the unit tag number and showing all principal dimensions, weights of the unit and major items, center of gravity, operational and maintenance clearance dimensions, material specifications and typical cross section views. The BIDDER may provide standard submittal drawings for this purpose.
3. Equipment specification with list of codes to which the equipment conforms and list of materials with ASME or ASTM number, type, grade, and final heat-treat condition.
4. Fan performance curve with a clearly marked design operating point.
5. Estimated sound power levels for eight octave bands.

6. Description of factory acceptance tests.
7. Description of proposed procedure for seismic qualification of the equipment.
8. Completion and return of the Equipment Specification Exceptions form with a description of any deviations or exceptions to this Specification (see Attachment 3).
9. Completion and return of the Equipment Data List form (see Attachment 4).

The BIDDER shall indicate additional documentation he proposes to supply.

5.3 Documentation Required after Contract Award

The documentation of the fan assembly shall include the following information as a minimum:

1. Certified outline drawings of the fan assembly, clearly marked with the unit tag number and showing all principal dimensions, weights of the unit and major items, center of gravity, operational and maintenance clearance dimensions, material specifications and typical cross section views. These drawings shall be specifically for the supplied equipment involved. Standard submittal drawings are not acceptable unless clearly marked or modified to indicate the concerned equipment.
2. Detailed drawings of components, sub-components or accessories. If these items are shown on separate drawings appropriate cross references shall be used.
3. Wiring diagrams and electrical bill of material of each electrical equipment item furnished.
4. Certified fan performance curve with a clearly marked design operating point and operation points for different opening angles of inlet box damper.
5. Certified fan sound power levels for eight octave bands.
6. Structural design information including forces and moments at every external equipment support interface, support hardware and bracket details, required anchor bolt sizes, anchor bolt locations, required anchor bolt materials, and specific anchor bolt torqueing requirements. (Where there are no specific torqueing requirements, the SUPPLIER shall so state). The SUPPLIER shall make provisions for transmitting any tension or shear loads to the anchor bolts.
7. List of used materials with ASME or ASTM number and grade.
8. Description of required site acceptance tests to be performed including a list of necessary test equipment.
9. Equipment start-up procedure.

The manufacturing documentation shall comprise the following as a minimum:

1. Documentation index;
2. Submittal schedule

3. Manufacturing and inspection plan;
4. Design and manufacturing documentation;
5. All certificates required with material;
6. Deviation, nonconformance and repair reports;
7. Seismic analysis reports;
8. Test procedures;
9. Test reports showing conformance to all testing procedures;
10. Cleaning procedures;
11. Packaging, handling and storage procedures;
12. Vendor technical manual;
13. List of recommended spare parts with MECL data tables filled in (see Attachment 6);
14. Statement of shelf life and operational life of the units;
15. Certificate of conformance with the requirements of this Specification;

5.4 Final Documentation

The SUPPLIER shall submit the original and one (1) electronic copy (CD, DVD, flash memory media) of the final technical documentation.

6 DESIGN REQUIREMENTS AND DESIGN INPUTS

6.1 General

Fans shall be designed in accordance with codes and standards listed in the section 3 of this Specification. The main design code shall be ASME AG-1.

Each fan and related components, including the motor, shall be designed for safe continuous operation under the operating conditions noted in the Fan Performance Data List. Fan motors shall be matched with the fans so that overloading does not occur on startup, or at any other point on the fan-operating curve.

Seismic qualification shall be performed in accordance with the requirements of the specification SP-S702 and the OSC Applicable OBE and SSE Floor Response Spectra Figures taken from the Appendices A and B of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1, see Attachment 2.

The design operating life of fans and accessories supplied under this Specification shall be 40 years.

The SUPPLIER shall certify that the equipment covered by this Specification will operate under all design loading combinations based on the design parameters specified herein.

6.2 Environmental Conditions

Fans will be installed in the OSC Building. The following data shall be used for design of equipment:

- Minimum temperature: 5 °C;
- Maximum temperature 40 °C;
- Relative humidity: 95 % (without condensate).

6.3 Fans

Fans shall be single width, single-inlet centrifugal type, tested in accordance with AMCA 210 for performance and AMCA 300 for sound.

Fan wheels and housing shall be all welded steel construction. Fan wheels shall be multibladed with backward curved or airfoil blades.

Bearings shall be self-aligning; grease lubricated and shall have an L-10 service rating life of at least 100,000 hours in accordance with ABMA 9 or 11. Concealed bearings or bearings in inaccessible locations shall be provided with stainless steel lubrication lines with grease fittings, usable in accessible areas without interrupting fan operation.

Bearings grease shall be of a type that will withstand the ambient radiation levels without losing its functional characteristics for a minimum period of 18 months.

Fans shall be statically and dynamically balanced. Dynamical balancing shall be performed at factory in accordance with AMCA 204 at fan design operating speed to Fan Application Category BV-4, Balance Quality Grade G2.5.

An adjustable motor support assembly shall be provided on the top by the fan casing.

Provision shall be made to securely lock the motor support assembly in position to maintain drive belt tension.

Fan shaft shall be supported by two bearings.

6.4 Motors

Motors shall conform to the requirements of Specification SP-E311. Fan and motor shall be mounted on a common steel base. The base shall be mounted on vibration isolators.

6.5 V-Belt Drives

V-belt drives shall have not less than two belts and shall have sufficient belt capacity to start and drive the fan if one belt is broken. After system has been air balanced (adjusted for final speed), fan vendor to provide fixed grove sheave for long term operation.

Each belt-driven fan shall be provided with a removable belt guard which has a test hole at each shaft for insertion of a tachometer. Each belt-driven fan shall also have an adjustable motor base.

6.6 Electrical Power Supply

A terminal box shall be provided on the exterior of each fan assembly for power wiring termination. See item designated "Conduit Entrance" in Specification SP-E311.

The Contractor shall be responsible for all materials and their procurement specification. All current carrying parts shall be copper made. Control, instrumentation and alarm wiring shall be a minimum of 14 AWG 7-strand copper conductors, 600V 90°C flame retarding insulation. Where wire is subjected to flexing on hinged panels 14AWG 41-strand extra flexible, copper conductors with 600V, 90°C flame-retardant insulation shall be used. Any insulation used shall be free from halogens (chloride, etc) and made from non-combustible materials. All electrical power interfaces shall be of minimum 4x 1 AWG size, screw type terminals. Control interfaces size shall be 14 AW and 16 AWG for instrumentation – both types also screw terminals.

6.7 Accessories

The following accessories shall be provided:

1. Flanged inlet transition box.
2. Flanged inlet box damper as volume control device complete with linkage and AC electric actuator. The electric actuator shall be 230V/1ph/50Hz spring return

type (5 seconds, spring operation) controlled with an external input control signal of 4 – 20 mA DC. The actuator shall be spring opposed to open damper (fail open) on loss of electrical power supply or control signal. The actuator shall be provided with travel stops incorporated in the actuator mechanism to limit the travel in either direction. The actuator torque shall be at least 150 % of the maximum torque required to actuate the blades.

3. Flanged expansion joints at inlet of the inlet box damper and at fan discharge.
4. Lifting lugs or eyes for installation and subsequent servicing of the equipment.
5. Access doors with suitable gaskets in appropriate locations to facilitate maintenance.
6. Unitary base frame with vibration isolators with appropriate provisions to withstand the forces generated or amplified during seismic event.

7 PERFORMANCE REQUIREMENTS

The performance requirements of fans required under this Specification are given in the Fan Performance Data List form in the Attachment 1.

8 MATERIALS AND DETAILS OF CONSTRUCTION

Materials used in the construction of fan components and accessories shall conform to requirements of ASME AG-1 Article BA-3000 and Article DA-3000.

The SUPPLIER shall state the identification of all material used in the construction of the units. Identification shall include ASME or ASTM number and grade.

Certified mill test reports shall be provided for materials used in the construction of the fans.

All materials shall be capable of withstanding a cumulative radiation level of up to 10 Gy.

9 FABRICATION AND ASSEMBLY

Fabrication shall be in accordance with the requirements of ASME AG-1, Section BA and Article AA-6000.

Written fabrication procedures shall be established and used during the manufacture. All heat treating requirements shall be indicated on drawings or in the fabrication procedures.

Materials shall conform to the requirements of ASME AG-1, Article BA-3000.

10 INSPECTIONS AND TESTS

10.1 Test Responsibility

The SUPPLIER shall perform all necessary factory acceptance tests to verify that supplied equipment meets requirements of applicable codes and standards and this Specification. Testing, inspection, and acceptance criteria shall conform to the applicable codes and standards as specified in ASME AG-1, Article BA-5000.

The supplier shall prepare test procedures for all factory acceptance tests and submit them to the PURCHASER for review and approval.

Any deficiencies or malfunctions, which occur during the tests, shall be corrected and the test repeated.

Test reports shall be prepared for each test and submitted to the PURCHASER for review and approval.

Prior to shipment, each item shall meet the performance requirements specified in the Fan Performance Data List.

10.2 Visual Inspection

Visual inspection shall be performed and documented in accordance with the requirements of ASME AG-1, Subarticle AA-5200, to verify that the fan is designed and constructed in accordance with applicable design codes and standards and this Specification.

10.3 Welds Inspection

Examination, inspection and testing of welds shall be performed and documented in accordance with the requirements of ASME AG-1, Subarticle AA-5300.

Welding procedures utilized in the fabrication of the fans shall be in accordance with AWS D1.1 or ASME Section IX. Welders shall be so qualified.

10.4 Performance Tests

Performance tests shall be performed in accordance with the requirements of ASME AG-1, Subarticle BA-5120.

Certified shop performance curves, developed from tests in accordance with AMCA 210 in an AMCA approved laboratory, shall be provided for each fan. The curve shall indicate efficiency, flow-head characteristics, and brake-horsepower requirements over the entire fan operating range and for different opening angles of inlet box damper.

10.5 Sound Tests

Sound tests shall be performed in accordance with the requirements of ASME AG-1, Subarticle BA-5130.

Sound level data report shall be provided for each size fan in accordance with either AMCA 300 or ASHRAE 68.

10.6 Mechanical Tests

Mechanical tests shall be performed in accordance with the requirements of ASME AG-1, Subsubarticle BA-5140, to verify the basic integrity and function of mechanical parts. These tests include the following:

1. Overspeed tests;
2. Leakage test;
3. Fan Vibration test;
4. Mechanical Running test;
5. Seismic test;

Seismic tests, if applicable, shall be performed in accordance with the requirements of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1, applicable seismic floor response spectra as defined in Attachment 2 and SUPPLIER's test procedures approved in advance by the PURCHASER.

10.7 Fan assembly Test

Upon completion of assembly and prior to shipment, each fan shall be operated at full operating speed with its own motor and drive. During this operation, the SUPPLIER shall:

1. Check the unit for smooth operation and record the vibration readings. Units, which exceed the allowable vibration shall be rebalanced and retested.
2. Measure and record the fan motor 3 phase current as recorded at motor leads and including drive loss.

Any deficiencies or malfunctions, which occur during the test, shall be corrected and the test repeated.

11 ITEM QUALIFICATION

11.1 Equipment Environmental Qualification (EQ)

The equipment covered by this Specification will operate in Mild environment during Design Basis and Severe Accidents. This means that environmental parameters during severe accidents will not be more severe than the environmental parameters during normal plant operation, specified in section 6.2. Also the 40 years normal operation total integrated dose, including the severe accident dose at equipment location is expected to be lower than 10 Gy (a formal limit for Harsh environment dose for equipment containing electronic components).

The SUPPLIER shall design the equipment to perform under specified environmental conditions (mild), supported by a maintenance schedule of the availability of equipment to perform its intended function at any time during the designed lifetime (aging addressed by surveillance, maintenance, etc.).

The SUPPLIER shall provide EQ documentation to the PURCHASER for review and approval. The provided documentation shall justify that equipment meets or exceeds the requirements of Specification.

11.2 Seismic Qualification

Seismic qualification shall be performed in accordance with the requirements of the specification SP-S702 and the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1.

The supplied equipment shall withstand Design Extension Conditions (DEC) seismic loads. Operating basis earthquake (OBE) floor response spectra and applicable safety shutdown earthquake (SSE) floor response spectra that are given in the Attachment 2 of this specification.

The SUPPLIER shall provide seismic qualification documentation to the PURCHASER for review and approval.

11.3 Electromagnetic (EMI) and Radiofrequency Interference (RFI) Evaluation

Instrumentation and control equipment covered by this Specification shall be designed and tested to ensure that all sensitive components are compatible with the electromagnetic environment for the locations in the power plant where the equipment will be installed. This includes consideration of emissions and susceptibility to both conducted and radiated electromagnetic and radio-frequency interference and capability to withstand power surges (SWC) in accordance with the following:

1. RG 1.180, Rev. 1, Guidelines for evaluating electromagnetic and radio-frequency interference in SR instrumentation and control systems;
2. EPRI TR-102323, Rev. 4, Guidelines for Electromagnetic Interference Testing in Power Plants;
3. MIL-STD-461E, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment;

4. IEEE 1050-2004, IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations;
5. IEC 61000, Electromagnetic Compatibility (EMC), Part 3 - Limits and Part 4 - Testing and Measurement Techniques;

Consideration of EMI/RFI/SWC shall include the effects of interference generated from all permanently mounted and transient EMI/RFI/Surge sources. These sources include such items as radio frequency transceivers, line surges, overhead cranes, motor controllers, relays, and any other electrical equipment located near the sensitive electrical equipment.

The new equipment shall have suitable filters so those instruments will not be sensitive to power spikes either induced or in the supply line. Interconnecting wiring shall be shielded where required. Use of metal oxide varistors and ferrite cores as attenuation devices is acceptable, if approved by the PURCHASER.

Modifications to standard equipment designs (shielding, filtering, and grounding) that are necessary to achieve acceptable testing results must be documented. The equipment must be installed in the same modified configuration and be reflected in the configuration controlled documentation.

Emissions and susceptibility testing shall be performed as applicable in accordance with the standards indicated in Table 1 and Table 2, respectively. A rationale should be provided if any of the tests is omitted.

Table 1: List of emissions tests

		MIL-STD-461	IEC 61000	FCC
Type		Test methods		
Conducted emissions	Low frequency	CE101	None	None
	High Frequency	CE102 (450 kHz – 2 MHz)	IEC 61000-6-4 (CISPR 11 Class A)	FCC Part 15 Class A
Radiated emissions	Low frequency	RE101	None	None
	High Frequency	RE102	IEC 61000-6-4 (CISPR 11 Class A)	FCC Part 15 Class A

Table 2: List of susceptibility tests

		MIL-STD-461	Commercial standard
Type		Test methods	
Conducted susceptibility	Low frequency	CS101 (30 Hz to 150 kHz)	IEC 61000-4-13 (16 Hz to 2.4 kHz) IEC 61000-4-16 (15 Hz to 150 kHz)
	High Frequency	CS114 (10 kHz to 30 MHz)	IEC EN61000-4-6 Disturbances induced by radiofrequency fields
Radiated susceptibility	Low frequency	RS101 Magnetic Field (30 Hz to 199 kHz)	IEC 61000-4-8 Magnetic Field (50 Hz and 60 Hz) IEC 61000-4-9 Magnetic Field (50/60 to 50 kHz) IEC EN61000-4-10 Magnetic Field (100 kHz and 1 MHz)
	High Frequency	RS103 Electric Field (30 MHz to 1 GHz)	IEC 61000-4-3 Electric Field (26 MHz to 1 GHz)
Surge		CS116 Damped Sinusoidal Transients (10 kHz to 100 MHz)	IEC EN61000-4-5 Surges IEC EN61000-4-12 100 kHz Ring Wave or IEEE C62.41-1991 Ring & Combination Wave
Electrically-Fast Transient/Burst		CS115 Bulk Cable Injection, Impulse Excitation	IEC EN61000-4-4 Electrically-Fast Transient/Bursts or IEEE C62.41-1991 EFT
Electrostatic discharge		None	IEC EN61000-4-2

A documented technical basis shall be provided when certification to a commercial testing standard not listed in the tables above is used to satisfy any of the testing requirements of this specification.

Testing limits and frequencies shall be based on Regulatory Guide 1.180, Rev. 1. As stated in the Regulatory Guide any of the three alternate testing programs may be selected. However, regardless of the emissions testing program selected, it is intended that each be applied in its entirety, without selective application of individual methods (i.e. no mixing and matching of test methods) for emission testing.

During and after test the testing equipment shall operate without degradation of critical functions or performance beyond the limits defined in the functional requirements (i.e. Performance Criterion A as per IEC 61000-6-1).

Critical, essential and protected equipment functions shall be monitored for acceptable operation and performance before, during and shortly after testing. A documented justification shall be prepared for all tests that result in degradation of

function. Non-critical functions may be degraded during the application of the test provided that normal operation of the tested equipment is self-recoverable to the condition immediately before the test (i.e. Performance Criterion B as per IEC 61000-6-1).

The SUPPLIER shall provide EMI/RFI evaluation documentation to the PURCHASER for review and approval.

12 CLEANING

Equipment internals shall be shop cleaned in accordance with ASME AG-1, Subsubarticle AA-6540 and ANSI/ASME NQA-1, Part II, Subpart 2.1.

The SUPPLIER shall submit cleaning procedures to the PURCHASER for review and approval.

13 CORROSION PROTECTION AND COATING

Corrosion protection and coating of exterior carbon steel and other surfaces susceptible to corrosion shall be in accordance with the requirements of Specifications SP-A5001 and SP-A5002.

Galvanized steel, stainless steel and non-ferrous surfaces shall not be painted.

The SUPPLIER shall submit corrosion protection and coating procedures to the PURCHASER for review and approval.

14 MARKING AND IDENTIFICATION

Each fan assembly shall be provided with a stainless steel nameplate (affixed in an accessible area with the following information), specified in ASME AG-1, Article AA-9000:

1. Tag number as indicated on the Fan Performance Data List;
2. NEK Purchase Order number;
3. Manufacturer's name;
4. Fan type, size and rotation;
5. Fan capacity;
6. Fan maximum speed;

The SUPPLIER shall establish and maintain a system for the identification of materials, parts, and components specified in ASME AG-1, Subarticle AA-8200. These measures shall ensure that identification of the item is maintained by the heat number, lot number, serial number, part number, or other appropriate means, either on the item or on records traceable to the item, throughout fabrication, shipment, and use of the item.

These identification and control measures shall be designed to prevent the use of incorrect or defective material, parts, and components as well as to provide a permanent record to assist in future evaluations of in service degradation of parts.

15 PACKAGING, HANDLING AND STORAGE

Packaging, handling and storage of fans shall be in accordance with the requirements of ASME AG-1, Article AA-7000 and ANSI/ASME NQA-1, Part II, Subpart 2.2. Protection level shall be level C.

Flanges, weld ends, and exposed finish surfaces shall be protected against corrosion or physical damage during shipment or storage. Rotating parts shall be properly blocked to insure that the bearings will not be damaged during loading, transport, and storage. Blocking materials shall be brightly colored to facilitate finding and removing before the equipment is placed in service.

The SUPPLIER shall prepare procedures for packaging, handling, storage and cleaning after installation. The packaging procedure shall take into account the method of transportation to be used, as well as the possible storage duration and storage environment. The procedures shall be submitted to the PURCHASER for review and approval.

If any special storage requirements are required, the SUPPLIER shall inform the PURCHASER sufficiently in advance of shipping to allow for necessary preparation.

16 NONCONFORMING MATERIALS

Any deviations or design changes which are not fully in accordance with the technical or quality assurance requirements of the procurement documents and which the SUPPLIER desires to accept, must be approved by the PURCHASER. Any such deviation request must be made in writing prior to disposition by means of a Deviation/Change Request Form submitted to the PURCHASER for approval prior to continuing work.

Nonconformance with specification requirements, and applicable codes and standards invoked by this Specification will not be accepted until approved by the PURCHASER. When such a condition exists, SUPPLIER shall initiate a Nonconformance Report (NCR) using the SUPPLIER's standard nonconformance document, which identifies the nonconformance and the SUPPLIER's proposed disposition.

The SUPPLIER shall:

1. Segregate the nonconformance item to prevent any further processing which may result in a change of the nonconformance as identified.
2. Make the NCR available to the responsible PURCHASER's inspector for review to ensure the nonconformance is completely identified and accurately stated.
3. Transmit NCR with recommended disposition to the PURCHASER in an expeditious manner. The SUPPLIER shall provide technical justification for the recommended dispositions.

The requirements of the specification are binding; no departures are acceptable without the prior consent of the PURCHASER.

The NCR shall provide the method by which the SUPPLIER shall obtain a documented response and approval from the PURCHASER when non-conformances are identified. The use of the NCR will pertain to the work at the SUPPLIER's shops.

Once the item is identified with a NCR, such NCR shall remain assigned to that item permanently and PURCHASER shall be advised of the originating NCR.

17 RECORDS

A record system shall be established and maintained by the SUPPLIER to provide documentary evidence of the quality of items and activities affecting quality. The quality assurance (QA) records shall include results of reviews, inspections, tests, audits, monitoring of work performance and material analyses. Records shall, as a minimum, identify inspector or data recorder, data inspection that was performed, type of observation, procedures used, results, acceptability, and action taken with any deficiency noted. Collection, storage and maintenance of records shall be in accordance with the requirements of the SUPPLIER's procedure.

Additional records or supporting data shall also be maintained. All quality verification records, procedures, and qualifications shall identify the item or activity involved. These records shall be retrievable and available for examination.

Responsible persons for generating, completing, or reviewing records shall ensure the following requirements are met:

1. Records are technically correct in accordance with applicable procedures.
2. Records are complete including all attachments. Records shall be reviewed to assure all required data, i.e., signatures, dates, etc., have been completed or marked not applicable (N/A) as required.
3. Corrections to data have properly been made. Corrections to data shall include the data and the identification of person authorized to make the corrections.
4. Records are legible – can be clearly read and suitable for microfilming. The original of all records should be transmitted to the PURCHASER as a record.

18 OTHER REQUIREMENTS

18.1 SUPPLIER's Responsibilities

The SUPPLIER shall be responsible for compliance with all of the detailed requirements presented in this Specification. Review and approval of any drawings, specifications and/or tests by the PURCHASER shall in no way relieve the SUPPLIER from these responsibilities.

Specific requirements which the SUPPLIER shall follow during design and fabrication process are given in the sections 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 of this Specification.

In addition to the requirements of this Specification, the SUPPLIER shall be responsible for performing analyses, tests, inspections and other activities which the SUPPLIER considers necessary to make sure that the design, material and workmanship are satisfactory for the service intended, or as may be required by common usage or practice.

The SUPPLIER shall obtain resolution of any conflict from the PURCHASER prior to proceeding with any work involving that conflict.

18.2 PURCHASER's Responsibilities

The PURCHASER shall have the following responsibilities:

1. Provide the SUPPLIER with all available documentation upon request.
2. Provide any special requirements applicable to the installation of equipment.
3. Designate a contract Responsible Engineer who will serve as the principal interface with the SUPPLIER.

Whenever the PURCHASER's approval is required in this Specification for submittals, procedures, methodologies, approaches or options, such approval shall be provided in writing or if provided orally shall be confirmed in writing. The PURCHASER will provide all required approvals in a timely fashion consistent with the project schedule.

The PURCHASER shall review proposed additions to the approved products listing and determine if they meet the requirements of the NEK Chemical Control Program. Approved products will be allowed on site with proper labeling.

19 RIGHT OF ACCESS

PURCHASER's representative shall be allowed to the all areas where the design, fabrication, and assembly of the components, subcomponents and accessories will take place such as shops, working areas, and engineering offices of the SUPPLIER and its suppliers at any time for the purpose of quality assurance audits, inspection and witnessing. Witness and hold points with advance notice requirements should be stipulated.

Such audits will include examination of documentary evidence of activities affecting quality and will be carried out on a planned, periodic basis during the course of the work to verify compliance with all aspects of the program and to determine the effectiveness thereof.

20 QA PROGRAM REQUIREMENTS

20.1 SUPPLIER's QA Program

This specification and NEK QA specification QS-610 Rev.1 establish the SUPPLIER's QA program requirements that shall apply to all activities affecting the quality of supplied equipment, materials, or services.

The SUPPLIER shall have its own Quality Assurance program that complies with ISO 9001 or equivalent and relevant requirements of QS 610 Rev.1 which shall assure that all services ordered by this specification conform to the requirements of this specification and the Code. Reporting of defects and noncompliance in accordance with SUPPLIER's QA Program and relevant requirements of NEK QS 610 Rev.1, shall be implemented by the SUPPLIER.

The SUPPLIER shall submit with Proposal one controlled copy of its Quality Manual proposed for the scope of work to be performed for the PURCHASER's review and acceptance.

The SUPPLIER shall retain full responsibility to perform QA function in all activities and his responsibility for QA implementation cannot be transferred to others or reduced in any way.

20.2 SUPPLIER's Responsibility for Subcontractors

The SUPPLIER shall ensure that its subcontractors meet applicable requirements of this Specification.

The Specification requirements shall apply to subsuppliers for works and services not performed by the SUPPLIER.

The SUPPLIER shall be fully responsible for all actions of his subcontractors in relation to the PURCHASER.

20.3 Certificate of Conformance/Compliance

The SUPPLIER and its subcontractors shall provide a Certificate of Compliance stating that all provided equipment and services meet requirements of codes, standards and this Specification.

20.4 Manufacturing and Inspection Plans

The SUPPLIER shall provide the Manufacturing and Inspection Plans with record (R), witness (W) and hold (H) points to the PURCHASER for review and approval prior to start of manufacturing.

The Manufacturing and Inspection Plans shall cover at least all relevant inspection requirements and shall outline the manufacturing and production sequence and specific inspections that are required to be performed.

The SUPPLIER shall update the Manufacturing and Inspection Plan and submit copies thereof to the PURCHASER when changes are approved by the PURCHASER.

21 SPECIAL HANDLING

The SUPPLIER shall specify any special handling requirements and provide the PURCHASER with appropriate procedure, which shall explain and emphasize them in detail.

The SUPPLIER shall provide any special requirements and advice for maintaining cleanliness of the components during extended site storage, indoors or outdoors, and installation.

The SUPPLIER shall also specify additional requirements necessary to maintain equipment warranties.

Special handling requirements shall be provided in the vendor technical manual.

22 SHELF LIFE

The SUPPLIER shall not ship any item that has less than one-year remaining shelf life at time of shipment.

The SUPPLIER shall provide shelf life data as follows:

1. Expiration date,
2. Cure date or manufacturing date, and
3. Material composition.

If the above requirements are not met the item will be shipped back to the SUPPLIER at the SUPPLIER's expenses.

23 10CFR21 REPORTING

Not applicable.

24 COMMERCIAL GRADE ITEM DEDICATION

Not applicable.

25 SUPPLIER DOCUMENTATION REQUIREMENTS

The SUPPLIER documentation requirements are given in the sections 5, 10, 11, 12, 13, 15, 16, 20, 27, 28, 30, 31, 33 and 34 of this Specification.

Each shipment must be accompanied by certification containing the signature of a person responsible for the quality function of the SUPPLIER, stating the material or items conform to all purchase order requirements. Applicable part numbers and other item identification, qualification reports and the NEK Purchase Order number shall be referenced by the certification.

The SUPPLIER shall provide to the PURCHASER a list of recommended spare and replacement parts or assemblies for the ordered / supplied item. The appropriate delineation of the technical and quality assurance related data required for ordering these parts or assemblies shall also be identified. Each part of supplied component must be notified on replacement parts list or Bill of Material. This data shall be supplied as portion of the final documentation package for information.

26 PURCHASER PROPRIETARY DATA

The PURCHASER has a proprietary interest in all of the drawings, designs, specifications, documents, information or know-how which may be furnished pursuant contract execution and in any know-how, improvement, discovery or invention which may be made, developed, or conceived in the performance of work hereunder or which may arise or result there from (hereinafter collectively referred to as the "Information"). All such information shall be considered to be proprietary to the SUPPLIER. The right to use of all such Information shall be transmitted to the PURCHASER only for its personnel use and shall be entirely restricted to the performance of the contract and subject to the confidentiality provision.

27 NONCONFORMANCE REPORTS

Nonconformances with specification requirements, approved drawings, and applicable codes and standards invoked by this Specification will not be accepted until approved by the PURCHASER.

Nonconformances to be reported for approval by the PURCHASER are those ones, which cannot be brought within specification requirements by rework or replacement. When such condition exists, the SUPPLIER shall initiate a Nonconformance Notice (NCN) using the SUPPLIER's standard proposed disposition. In addition, the SUPPLIER shall:

1. Segregate the nonconforming item to prevent any further processing which may result in a change of the nonconformance as identified.
2. Properly disposition and send the NCN to the PURCHASER.
3. Provide technical justification if recommended disposition is "Use-As-Is" or "Repair".

The resolution NCN shall be approved by the PURCHASER. Further engineering and/or manufacturing after detection of non-conformances, prior to the PURCHASER's approval shall be at the SUPPLIER's risk.

The non-conformance report shall provide a method by which the SUPPLIER shall obtain a documented response and approval from PURCHASER when non-conformances are identified. The use of the non-conformance reports will pertain to work at the SUPPLIER's and/or subcontractors' shops.

28 REPAIR RECORDS

Together with the documentation package shipment the SUPPLIER shall provide the PURCHASER with all generated repair records and they shall include as a minimum the following information:

1. Summary of repair/refurbishment work that has been performed on the item(s).
2. Brief analysis of the reason for failure of the item(s).
3. Details of any special processes used during repairs that were not used during fabrication.
4. A list of replacement parts installed in the repaired items(s).

29 SOURCE INSPECTION/SURVEILLANCE NOTIFICATION

SUPPLIER shall provide access to the SUPPLIER 's plant facilities and records pertaining to this Specification for the purpose of planning and performing source inspection / surveillance activities.

The PURCHASER requires ten (10) working days advance notice for the purpose of establishing hold points and ten (10) working days advance notice that witness or hold points have been reached.

The SUPPLIER shall contact the PURCHASER's designated representative when a witness or hold points have been reached. The SUPPLIER will not proceed past that point until inspection has been established or waived by the PURCHASER.

Inspection or examinations performed by the PURCHASER, or designated representatives do not relieve the SUPPLIER of its responsibility to meet the requirements of this Specification.

30 SHIPPING REQUIREMENTS

Shipping shall be in accordance with the requirements of ASME AG-1, Article AA-7000 and ANSI/ASME NQA-1, Part II, Subpart 2.2. Protection level shall be Level C.

The SUPPLIER shall provide packaging and shipping methods for protection from the effects of temperature extremes, humidity, transit shocks and jarring.

The shipping container shall be clearly tagged with the NEK identification number and NEK Purchase Order number.

Material and all certifications or accompanying documentation supplied within the scope of this specification shall be directly shipped from the SUPPLIER to PURCHASER. The import agent shall not take possession of material or documentation.

The PURCHASER's authorized source inspectors have the right to hold shipment if purchase order requirements are not met.

31 DELIVERY SCHEDULE

After contract award, the SUPPLIER shall, on the basis of delivery milestones defined in the contract, provide an integrated detailed delivery schedule with milestones for fabrication and delivery of component(s) which will be provided within the scope of this Specification.

32 WITNESS AND HOLD POINTS

The SUPPLIER shall provide the Manufacturing and Inspection Plan of overall activities in accordance with the scope of contractual activities to the PURCHASER for review and approval.

The PURCHASER shall have the right to determine his own witness and hold points in the SUPPLIER's Manufacturing and Inspection Plan. For these witness and hold points the PURCHASER may establish notification points for which the SUPPLIER shall give prior notification to the PURCHASER. In addition, the PURCHASER may establish hold points and temporary notification points if necessary to ensure resolution of quality problems or temporary quality problems.

Predetermined hold points and notification points require receipt of notification at least ten (10) working days in advance of the scheduled time of performance.

Predetermined witness and hold points require receipt of notification at least ten (10) working days in advance of the scheduled time of performance.

The following hold points for which a prior notification is required are:

1. Factory tests;
2. Shipping release;

The SUPPLIER shall not proceed beyond the predetermined hold points without written approval from the PURCHASER.

33 VENDOR TECHNICAL MANUAL AND REGISTERED UPDATES

The SUPPLIER shall furnish a vendor technical manual with all necessary information for operation and maintenance, updated specific data and equipment(s) drawings. Standard manuals are not acceptable unless clearly marked or modified to indicate the concerned equipment.

A special attention shall be paid to technical documentation and instructions for the following topics:

1. Storage;
2. Installation;
3. Operating instructions;
4. Maintenance instructions and servicing schedule;
5. Troubleshooting;
6. Replacement parts;
7. Special tools and instrumentation;
8. Drawings of components and related equipment.

The SUPPLIER shall also provide drawings for all components and related equipment with a list of components, appertaining "part numbers" and their materials as part of the manual together with the list of recommended spare parts.

Table of contents of the vendor technical manual is given as a guideline in the Attachment 5.

34 TRAINING

Not applicable.

35 ATTACHMENTS

Attachment 1: Fan Performance Data List forms (2 pages)

Attachment 2: Applicable Floor Response Spectra Figures from the Appendices A and B of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1 (4 pages)

Attachment 3: BIDDER'S Equipment Specification Exceptions form (1 page)

Attachment 4: Equipment Data List form (2 pages)

Attachment 5: Vendor Technical Manual Guideline (1 page)

Attachment 6: MECL Data Tables (2 pages)

ATTACHMENT 1
FAN PERFORMANCE DATA LIST
KRŠKO NUCLEAR POWER PLANT

1.	Tag number	VA781FAN-001 VA781FAN-002
2.	Quantity required	2
3.	Safety Class	NSR/AQ
4.	Seismic Category	I
5.	Fan location	OSC, P36; El. 101.80m
6.	Applicable floor response spectra from 1056-NA-L-3/1-A1	OBE Level 1 SSE Level 1
7.	Ambient conditions at equipment location	
a.	Temperature °F (°C)	104 (40) max
b.	Relative humidity, %	95 max
c.	Barometric pressure, inch Hg (kPa)	29.37 (99.44)
8.	Operating conditions	
a.	Flow capacity, cfm (m³/h)	6000 (10200)
b.	Flow temperature, °F (°C)	68-79 (20-26)
c.	Flow relative humidity, %	30-60
d.	Fan static pressure, in w.c. (Pa)	9.04 (2250)
9.	Fan type	Centrifugal-SWSI
10.	Fan leakage criteria (per ASME AG-1, BA-4140) applicable	Yes
11.	Preferred wheel diameter, in (mm)	18 (457.2)
12.	Inlet box required	Yes
13.	Inlet box position (per AMCA 2405)	-360 (Top down intake)
14.	Fan capacity control type	Inlet box damper
15.	Inlet box damper actuator electrical characteristics, V/phase/Hz	230/1/50
16.	Inlet box damper actuator control characteristics	4-20 mA DC
17.	Drive type	Belt

18.	Arrangement of drive (per AMCA 2404 or 2410)	<u>9</u>
19.	Direction of rotation (per AMCA 2406)	<u>Counterclockwise</u>
20.	Discharge direction (per AMCA 2406)	<u>Top Angular Up CW45</u>
21.	Preferred motor location on pedestal (viewed from the drive side)	<u>Left</u>
22.	Preferred Construction class (per AMCA 2408)	<u>III</u>
23.	Preferred Motor horsepower, hp (kW)	<u>15.82 (11.8)</u>
24.	Motor electrical characteristics, V/phase/Hz	<u>400/3/50</u>
25.	Nuclear radiation – resisting motor insulation required	<u>Yes</u>
26.	System operation	<u>Two fans parallel</u>

ATTACHMENT 2

**Applicable OBE and SSE Floor Response Spectra Figures
from the Appendices A and B of the OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1**

NOTES:

Names of Floor response spectra on each figure include considered direction (X, Y, Z), state (OBE, SSE), for Level 1 (nivo 1) and value of damping (%).

Considered directions according to “true north” and “plant north”:

- Direction X = East – West response,
- Direction Y = North – South response,
- Direction Z = Vertical response

Actual levels according to “local zero” (+/-0,00m = altitude +157,85m a.s.l.= NEK altitude 102,650m):

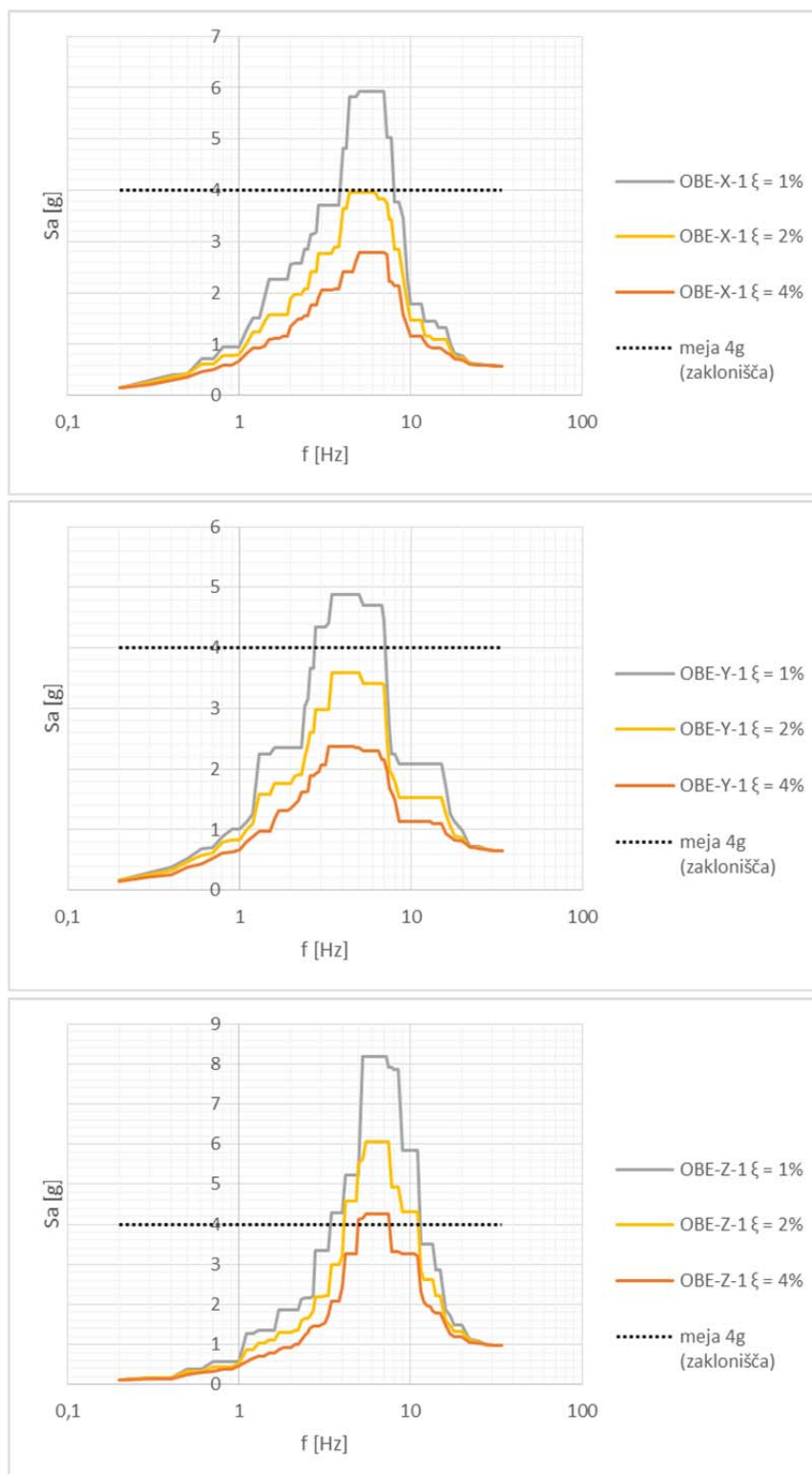
- Level 1 = Slab's axial elevation corresponds to NEK altitude 101,300m;

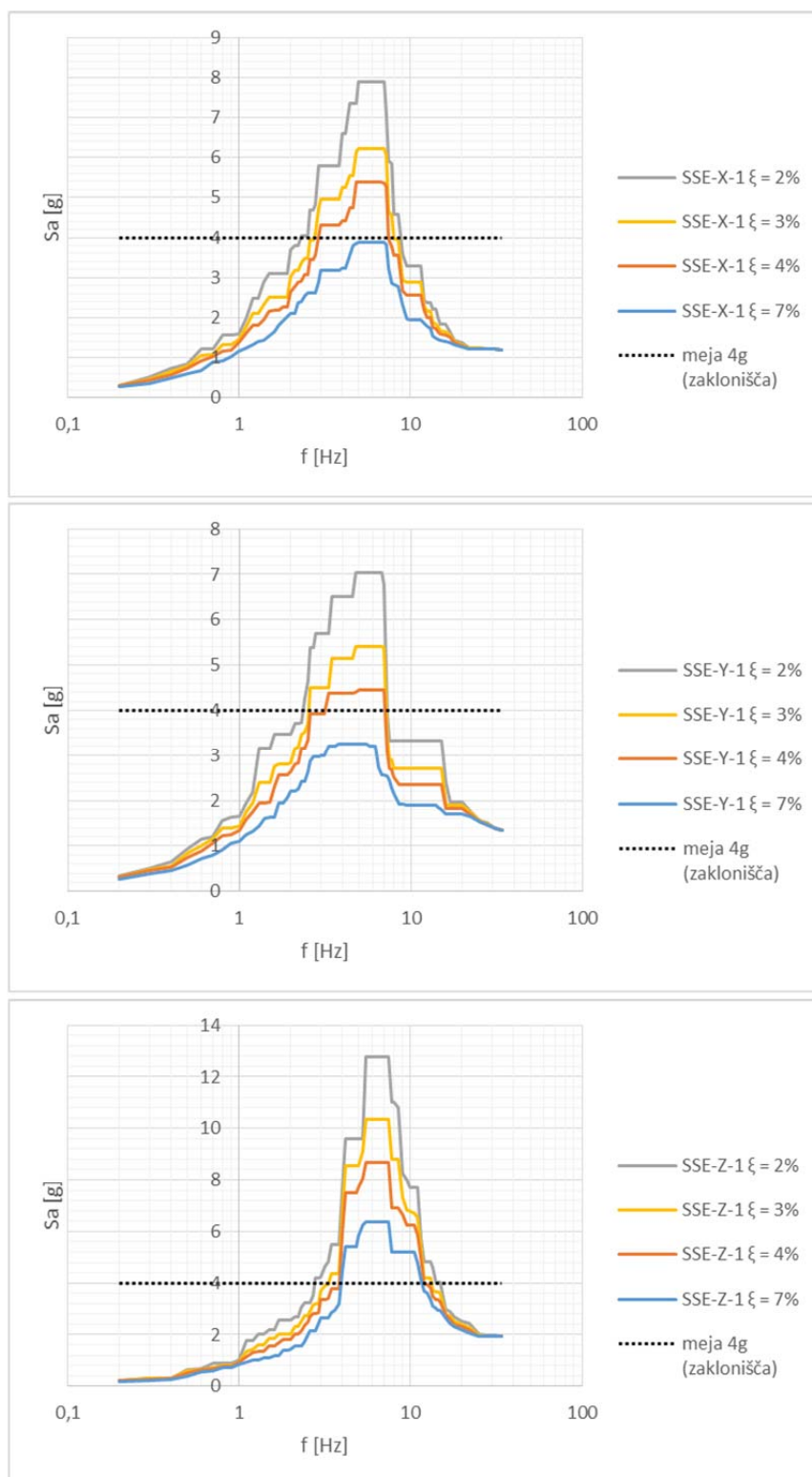
OPC building is considered as shelter, that is why there is a rule for minimum value of equipment accelerations (shown on each FRS chart as “meja 4g (zaklonišča)”):

- For higher levels (Level 1): $S_{a,min} = 4g$.

Included floor response spectra:

- OBE: Level 1 (Etažni spektri – OBE – nivo 1) for all directions and dampings (page 5 of Appendix A of Document OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1);
- SSE: Level 1 (Etažni spektri – SSE – nivo 1) for all directions and dampings (page 5 of Appendix B of Document OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1).

- OBE: Level 1 (Etažni spektri – OBE – nivo 1)

- SSE: Level 1 (Etažni spektri – SSE – nivo 1)

ATTACHMENT 3
EQUIPMENT SPECIFICATION EXCEPTIONS
KRŠKO NUCLEAR POWER PLANT

The BIDDER certifies that the Proposal is in complete and absolute agreement with this Specification, except as specifically outlined below (use additional sheets if required).

BIDDER'S NAME

MANUFACTURER'S NAME

QUOTATION NUMBER

SIGNATURE

TITLE

Exceptions from this Specification:

ATTACHMENT 4
BIDDER'S EQUIPMENT DATA LIST
KRŠKO NUCLEAR POWER PLANT

Each BIDDER shall return one copy of this form with all the blanks filled in for each size of fan.

BIDDER'S NAME

MANUFACTURER'S NAME

QUOTATION NUMBER

1. **Guarantee conditions**

a. Tag number

b. Air flow capacity, cfm (m³/h)

c. Fan static pressure, in. w.c. (Pa)

d. Fan type

2. **Fan data**

a. Fan wheel diameter, in. (mm)

b. Fan wheel speed, rpm

c. Arrangement of drive

d. AMCA Construction class

e. Motor location on pedestal (viewed from the drive side)

f. Number of V-belts

g. Belt size

h. Driven sheave size, in. (mm)

i. Driver sheave size, in. (mm)

j. Bearing size, in. (mm)

k. Bearings L-10 service rating life, hours

l. Range of speed adjustment, rpm

m. Minimum thickness of fan casing, in. (mm)

3. **Electrical data**

a. Fan motor rating, hp (kW)

b. Fan motor speed, rpm

c. Fan motor power supply, V/phase/Hz

4. **Weight**

a. Total weight of assembly, lb (kg)

5. **Materials**

a. Wheel material and ASTM number

b. Fan scroll material and ASTM number

c. Fan shaft material and ASTM number

ATTACHMENT 5
VENDOR MANUAL GUIDELINE
KRŠKO NUCLEAR POWER PLANT

INTRODUCTION

Purpose and Scope of Manual

Definitions

1 EQUIPMENT DESCRIPTION

1.1 System description and purpose

1.2 Equipment Functional Description and Specifications

2 INSTALLATION

2.1 Receiving

2.2 Handling

2.3 Installing

2.4 Connections, grounding and shielding

2.5 Cleaning and inspection

2.6 On-site testing

2.7 Removal of equipment from service

2.8 Storage and maintenance instructions

3 OPERATING INSTRUCTIONS

3.1 General

3.2 Safety precautions

3.3 Start-up procedures

3.4 Operation

3.5 Operational checkout at plant shutdown

3.6 Testing at power

3.7 Equipment set points

4 MAINTENANCE

4.1 Preventive maintenance procedures and programs

4.2 Safety precautions and interlock checks

4.3 Test equipment and tools for maintenance and troubleshooting

4.4 Dismantling and reassembly of assemblies and subassemblies

4.5 Alignment and adjustment procedures (including torque sheet data)

4.6 Operational performance test

5 TROUBLESHOOTING

5.1 Troubleshooting procedures and/or troubleshooting chart

6 REPLACEMENT PARTS

6.1 Parts Lists

6.1.1 Introduction

6.1.2 Maintenance Parts List

6.1.3 List of Manufacturers and addresses with ordering instructions

6.2 Recommended parts List

7 SPECIAL TOOLS AND INSTRUMENTATION

7.1 List of Special Tools, P/N, Spec. Tools DWG's

8 DRAWINGS & FIGURES

ATTACHMENT 6 MECL DATA TABLES

Table 1: List of equipment data for new components

NO.	EQUIP NO.	DISCIPLINE		
1	EQUIP DISCIPLINE	E	I	M
2	EQUIP CATEGORY			
3	SYSTEM CODE			
4	PARENT EQUIP NO			
5	EQUIP STATUS CODE			
6	EQUIP TYPE			
7	FUNCTIONAL DESCRIPTION			
8	EQUIP NOTE TEXT			
9	TEXT VERIF			
10	LABEL TYPE			
11	POSITION			
12	LABEL TEXT			
13	EQUIP SUBCATEGORY			
14	ASME CODE CLASS			
15	ANSI SAFETY CLASS			
16	IEEE SAFETY CLASS			
17	SEISMIC CATEGORY			
18	EQUIP QUALIFICATION REQUIRED			
19	SAFETY RELATED			
20	INSTR LIST N/A			N/A
21	SCM SC			
22	SAF.FUNC.			
23	BUILDING ID			
24	ROOM NO			
25	EQUIP ELEVATION			
26	EX ZONE			
27	DESIGN PRESSURE	N/A		
28	PRESSURE UOM	N/A		
29	DESIGN TEMPERATURE	N/A		
30	TEMPERATURE UOM	N/A		
31	MODEL			
32	SPIN			
33	SERIAL NO			
34	VALVE ID	N/A	N/A	
35	MANUFACTURER ID			
36	MANUFACTURER BRANCH ID			
37	VENDOR ID			
38	VENDOR BRANCH ID			
39	MANUFACTURER PART NO			
40	PURCHASE ORDER NO			
41	INSTALLATION YEAR			
42	VOLTS N/A			
43	AMPS N/A			
44	HP KW N/A N/A			
45	RPM N			

Table 2: List of equipment data for spare parts

MECL EQUIP. NO.	
EQUIPMENT DESCRIPTION	
PART NUMBER	
MANUFACTURER	
REFERENCE DOCUMENT	INSTRUCTION MANUAL
	DRAWING NO.-REV. NO.
	BILL OF MATERIAL

Table 3: List of equipment spare parts

ITEM NO.				
MANUFACTURER PART NUMBER (MPN)				
MPN DESCRIPTION				
SAFETY CLASSIFICATION				
QUANTITY				
UNIT OF MEASURE (UOM)				
MANUFACTURER TITLE ADDRESS				
SERIAL NUMBER				
LOT/HEAT/REAL/BATCH NO.				
SHELF LIFE CONTROL				
SHELF LIFE MONTHS				
ASME CODE PN				
IEEE PN				
STORAGE LEVEL				
ISM REQ				
QUALIFIED LIFE - MONTHS				
SERVICE/OPERATION LIFE - MONTHS				
RECOMMENDED QUANTITY				
ITEM PRICE				
PURCHASE ORDER NO.				
REFERENCE RECORDS				