

NEK



Technical Specification

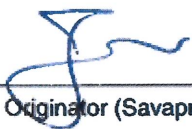
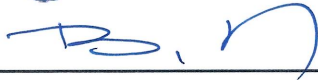



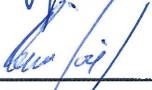


OSC, AUTOMATIC DAMPERS WITH ACCESSORIES

KRŠKO NUCLEAR POWER PLANT

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Revision 0

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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, AUTOMATIC DAMPERS
AND ACCESSORIES
(Rev. 7)**

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2	9.3.2017	Revision correction previously given by investor	---
3	25.4.2017	Revision correction previously given by investor	---
4	5.6.2017	Consideration of changes in the flow diagram	---
5	11.9.2017	Revision correction previously given by investor 26.7.2017	---
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7	08.02.2018	Consideration of corrections suggested during technical dialog performed by investor	---

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Attachment 1: Automatic Dampers Performance Data (27 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: Equipment Specification Exceptions Form (1 page)

Attachment 4: Vendor Technical Manual Guideline (1 page)

Attachment 5: EAM-MECL Data Tables (2 pages)

1 SCOPE

1.1 Scope of Work

This Specification includes the information required for the procurement of automatic dampers with electric actuators and accessories 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) Seismic Category I.

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. Integrally assembled dampers with electric actuators and accessories, as indicated in this Specification and on Damper Performance Data Sheets. Electric actuators shall be suitable for 230V/1ph/50Hz power supply.
2. One complete set of special tools necessary for assembly and disassembly of supplied equipment.
3. Performance of all necessary factory acceptance tests.
4. Documentation of each damper assembly, as required in sections 5.3 and 5.4 of this Specification.
5. Packaging and preparation for shipment.

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

The following equipment, material, and services will be furnished by OTHERS:

1. Receiving, unloading and installation of damper assemblies at the JOBSITE including bolts and gaskets.
2. Electrical power supply and external wiring of damper assemblies.
3. External control wiring of damper assemblies.

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
DEC	Design Extension Conditions
EAM	Enterprise Asset Management
EAM-MECL	EAM Master Equipment Component List
EMI	Electromagnetic Interference
EQ	Equipment 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) contracted by NEK
PURCHASER	Nuclear Power Plant Krško
QA	Quality Assurance
RFI	Radiofrequency Interference
SSE	Safety Shutdown Earthquake
SUPPLIER	An entity, which supplies equipment and/or services to NEK per this Specification
SWC	Surge Withstand Capability

3 CODES, STANDARDS AND REGULATORY REQUIREMENTS

Automatic dampers and accessories 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 portions of the following codes and standards:

1. Air Moving and Conditioning Association (AMCA)
 - a. AMCA 500D, Laboratory Methods of Testing Dampers for Rating;
2. 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;
3. American Welding Society (AWS)
 - a. D1.1, Structural Welding Code, Steel;
4. Electric Power Research Institute (EPRI):
 - a. EPRI TR-102323, Rev. 4, Guidelines for Electromagnetic Interference Testing in Power Plants;
 - b. EPRI 3002002982 Technical Report, September 2014, Plant Engineering: Guideline for the Acceptance of Commercial-Grade Items in Nuclear Safety-Related Applications: Revision 1 to EPRI NP-5652 and TR-102260;
5. International Electrotechnical Commission (IEC):
 - a. IEC 61000, Electromagnetic Compatibility (EMC), Part 3 - Limits and Part 4 - Testing and Measurement Techniques;
6. Institute of Electrical and Electronics Engineers (IEEE):
 - a. IEEE 1050-2004, IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations;
7. National Electrical Manufacturers Association (NEMA):
 - a. NEMA 2-125, Contacts for Control Circuit Devices;
 - b. NEMA 250, Enclosures for Electrical Equipment (1000 Volts Maximum);
8. NRC Regulatory Guides:
 - a. RG 1.29, Seismic Design Classification, Rev. 1, August 1973;
 - b. RG 1.52, 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;

9. 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-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.

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 (construction, size, performance, pressure drop data, actuator characteristics, controls, etc.).
2. Preliminary outline drawings of damper assemblies clearly marked with the damper assembly tag number, showing general arrangement, overall dimensions, section views, actuator arrangement, accessories, flanged end details, clearance space required for maintenance or disassembly, weight and center of gravity. 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 and grade.
4. Description of factory acceptance tests.
5. Description of proposed procedure for seismic qualification of the equipment.
6. Completion and return of the Damper Performance Data Sheets. The BIDDER

shall provide data indicated with an asterisk (*) on each datasheet (see Attachment 1).

7. Completion and return of the Equipment Specification Exceptions form with description of any deviations or exceptions to this Specification (see Attachment 3).

The BIDDER shall indicate additional documentation he proposes to supply.

5.3 Documentation Required after Contract Award

The documentation of each damper assembly shall include the following information:

1. Certified outline drawings of damper assemblies, clearly marked with the damper assembly tag number, showing general arrangement, overall dimensions, section views, actuator arrangement, accessories, flanged end details, clearance space required for maintenance or disassembly, damper assembly weight and its center of gravity. These drawings shall be specifically for the supplied equipment. 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. Electric wiring diagrams, schematic diagrams and electrical bill of material of each supplied electrical equipment item.
4. Performance data of each damper assembly, such as pressure drop at rated flow, frame leakage and seat leakage rates at design pressure, bearing design life and seal design life.
5. List of used materials with ASME or ASTM number and grade.
6. Any limitations regarding installation of damper assemblies. If there is no indication on the drawing, it shall be assumed that the component can be installed in any position and functions properly.

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. Factory acceptance test procedures;
9. Factory acceptance test reports showing conformance to all testing procedures;
10. Cleaning procedures;

11. Final inspection/Completion Report;
12. Quality Verification and Release;
13. Packaging, handling and storage procedures;
14. Vendor technical manual;
15. List of recommended spare parts with EAM-MECL data tables filled in (see Attachment 5);
16. Statement of shelf life and operational life of the units;
17. Certificate of conformance/compliance with the requirements of codes, standards and 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 and quality documentation as required by codes, standards, regulations and this Specification.

6 DESIGN REQUIREMENTS AND DESIGN INPUTS

6.1 General

Damper assemblies 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.

Damper assemblies described in this Specification shall be considered as an integral unit and operational conformance of such equipment with this Specification shall be the responsibility of the SUPPLIER.

If an actuator or accessories are required to be provided, they shall be mounted on the damper wherever possible with all the interconnecting wiring and linkages installed. When actuators, accessories, or both cannot be mounted on the damper, their wiring or linkages shall be prefitted and shipped securely fastened to the damper.

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 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

Damper assemblies will be installed in the OSC Building. The following data shall be used for design of dampers, as indicated on the Automatic Dampers Performance Data Sheets:

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

The following data shall be used for design of dampers located in outside air intake ducts, as indicated on the Automatic Dampers Performance Data Sheets:

- Minimum temperature: -35.1 °C;
- Maximum temperature: 46 °C DB, 36 °C WB;

6.3 Dampers

Automatic dampers shall be designed on the basis of information indicated on the Damper Performance Data Sheets.

Damper assembly (frame and blade) design pressure shall be 17.74 inch w.g. (4400 Pa). Damper assembly (frame and blade) operating pressure shall be 9 inches w.g.

(2250 Pa).

Automatic dampers shall preferably be an opposed-blade type with blades parallel to the first dimension (width).

Automatic dampers shall have a flanged galvanized steel channel frame and single thickness galvanized steel blades. Flange dimension shall be 2 in (50 mm).

Blade-operating linkage shall be located outside the damper mounting frame and shall not project into the air stream.

All dampers shall be tested in accordance with ASME AG-1 Code Subarticle DA-5100 and its Subsubarticles. Frame and seat leakage rates shall be less than or equal to the amount shown in the ASME AG-1, Mandatory Appendix DA-I.

Bearings shall be relubricable sealed ball type, mounted in an external flanged cartridge.

Appropriate seals shall be provided to maintain the specified frame and seat leakage rates during the design life of the seal material.

Any damper having a preferred direction of air flow shall be marked to indicate the direction of flow in a manner clearly visible after installation.

6.4 Additional Requirements for Bubble Tight Dampers

Bubble tight dampers shall be designed for zero leakage at 17.74 inch w.g. (4400 Pa). Leakage shall be determined in accordance with the requirements of ASME AG-1, Subsubarticles DA-5130 and DA-5140.

Bubble tight dampers shall have a flanged stainless steel channel frame. Blades shall be made of stainless steel and shall be rectangular, dished, or round with rectangular transitions type.

Bubble tight dampers shall close upon receipt of closure signal or manually.

6.5 Actuators

The actuators shall be electric, suitable for 230V/1ph/50Hz electrical power supply.

The actuators shall be provided with spring return to fail position, as indicated on the Damper Performance Data Sheets.

The actuators shall be provided with travel stops incorporated in the actuator or damper blade drive 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.

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 3x 12 AWG size, screw type terminals. Control interfaces size shall be 14 AW and 16 AWG for instrumentation – both types also screw terminals.

6.6 Accessories

Damper assemblies shall be provided with the following accessories:

1. Mechanical position indicators to provide an external position reference of the actuator.
2. Limit switches, if they are not already included in the actuator mechanism. Limit switches shall be snap-acting and mounted a manner to provide reliable actuation by means of the damper/actuator linkage. Enclosures shall be NEMA Type 4 (watertight) with a minimum of two normally open and two normally closed electrically separate contacts in each switch assembly. Contacts for interlock and control functions shall be rated for a minimum of 6 amperes (inrush) and 0.5 amperes (interrupting) at 125 VDC.
3. Actuator manual override for emergency operation, as indicated on the Damper Performance Data Sheets.
4. Connection shall be of screw type terminal, 14 AWG in size.

7 PERFORMANCE REQUIREMENTS

Performance requirements of damper assemblies required under this Specification are given on the Dampers Performance Data Sheets in the Attachment 1.

Automatic damper design shall not permit vibration or excess leakage under any design conditions.

Dampers shall be sized for given dimensions on the Dampers Performance Data Sheets and has to achieve proper control characteristics.

Damper actuators shall be sized with ample power to meet the specific requirements of the associated damper, with the input signal as indicated on the Automatic Damper Data Sheets.

8 MATERIALS AND DETAILS OF CONSTRUCTION

Materials used in the construction of frames, blades, shafts and linkages shall conform to requirements of ASME AG-1, Article DA-3000.

Materials which could produce harmful or toxic effects when heated shall not be used. The exception is Teflon insulation used on wires and cables (wiring with PVC insulation shall not be used).

Flammable materials which could ignite or explode from an electric spark, flame, heating, or which could independently support combustion shall not be used unless approved by the PURCHASER (where other construction is impracticable).

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.

All materials shall be capable of withstanding a cumulative radiation level of up to 10 Gy. Moreover bubble tight isolation dampers including its electric actuators shall be capable of withstanding a cumulative radiation level of up to 100 Gy.

9 FABRICATION AND ASSEMBLY

Fabrication and assembly shall be in accordance with the requirements of ASME AG-1, Article DA-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.

Welding of components shall be in accordance with AWS D1.1 or ASME Section IX. Welders and welding procedures shall be so qualified.

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. Inspection and testing of dampers shall be performed in accordance with ASME AG-1, Article DA-5000.

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

A defective damper shall be repaired or rejected and documented as a nonconformance. Repairs shall be made in accordance with qualified repair procedures. Repaired dampers shall be then retested.

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 Dampers Performance Data Sheets.

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 dampers are 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.

Any weld defects shall be documented as a nonconformance. Welds shall be repaired using the original or a repair weld procedure. Repaired welds shall be then reinspected.

10.4 Seismic tests

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 as it is defined in Attachment 2 and SUPPLIER's test procedures approved in advance by the PURCHASER.

10.5 Performance tests

The following performance tests in accordance with ASME AG-1, Subarticle DA-5100 shall be performed:

1. Pressure drop test in accordance with ASME AG-1, Subsubarticle DA-5110.
2. Cycle test in accordance with ASME AG-1, Subsubarticle DA-5120. Bubble tight dampers shall be also tested for closure time.
3. Frame leakage class in accordance with ASME AG-1, Subsubarticle DA-5130. Leakage shall be equal or less than the amount shown in the Mandatory Appendix DA-I for the specified leakage class.
4. Seat leakage class in accordance with ASME AG-1, Subsubarticle DA-5140. Leakage shall be equal or less than the amount shown in the Mandatory Appendix DA-I for the specified leakage class.

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). Moreover bubble tight isolation dampers including its electric actuators shall be capable of withstanding a cumulative radiation level of up to 100 Gy.

The SUPPLIER shall design the equipment to perform its intended function 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 this Specification.

11.2 Seismic Qualification

Seismic qualification shall be performed in accordance with the requirements of the specification SP-S702.

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

Cleaning shall be performed 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

Equipment supplied within the scope of this Specification shall be provided with a stainless steel nameplate in accordance with the requirements of ASME AG-1, Article DA-9000, affixed in an accessible area with at least the following information:

1. NEK tag number as indicated on the Dampers Performance Data Sheets;
2. NEK Purchase Order number;
3. Manufacturer's name;
4. Damper serial number;
5. Damper type and size;
6. Design air flow rate;

The SUPPLIER shall establish and maintain a system for the identification of materials, parts, and components. 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 damper assemblies shall be in accordance with the requirements of ASME AG-1, Article AA-7000. and ASME NQA-1, Part I, Requirement 13, Part II, Subpart 2.2. Protection level shall be Level B.

Any special tools required to adjust, assemble, or disassemble the damper assemblies shall be shipped with the dampers. Tools shall be shipped in a suitable separate container clearly marked with the name of the dampers for which the tools are intended.

The SUPPLIER shall prepare procedures for packaging, handling, storage and cleaning after installation. 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 and performance 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 QA 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 5 (five) years 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;
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, 23, 27, 28, 29, 30, 31, 33 and 34 of this Specification.

Prior to start of fabrication, the SUPPLIER shall prepare a preliminary Documentation Index detailing the quality assurance documents which will be required to comply with this specification and referenced codes and standards. The index shall identify both by document type and the specific component or part, each individual document that will be submitted to the PURCHASER for information and approval. It shall also identify records, which will document the results of operations, inspections and tests. Upon completion of equipment fabrication, testing, and inspection, but prior to release for shipment, the Index shall be finalized to show the drawings and procedures actually used and the records which document the results of all inspections and tests performed. The final Documentation Index shall be verified for accuracy and completeness and submitted to the PURCHASER.

Each shipment must be accompanied by certification containing the signature of a person responsible for the quality control 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 be responsible for inspecting the items and checking the applicable records, prior to shipment, to verify compliance with all specific requirements. Acceptance of the completed sets of records by the PURCHASER doesn't relieve the SUPPLIER of responsibility for compliance with specification requirements.

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 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 nonconformances, prior to the PURCHASER's approval shall be at the SUPPLIER's risk.

The nonconformance report shall provide a method by which the SUPPLIER shall obtain a documented response and approval from PURCHASER when nonconformances are identified. The use of the nonconformance 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

The 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 as stated in the previous paragraph, 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 B.

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 acceptance 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 4.

34 TRAINING

Not applicable.

35 ATTACHMENTS

Attachment 1: Automatic Dampers Performance Data (27 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: Equipment Specification Exceptions Form (1 page)

Attachment 4: Vendor Technical Manual Guideline (1 page)

Attachment 5: EAM-MECL Data Tables (2 pages)

ATTACHMENT 1
AUTOMATIC DAMPER PERFORMANCE DATA
KRŠKO NUCLEAR POWER PLANT

DATA SHEET INDEX

Data Sheet No.	Damper Tag No.
001	FCV8900A
002	FCV8900B
003	FCV8901A
004	FCV8901B
005	FCV8902A
006	FCV8902B
007	FCV8911
08	FCV8920
09	FCV8922
010	FCV8923
011	FCV8938
012	FCV8942
013	FCV8943A
014	FCV8943B
015	FCV8947A
016	FCV8947B
017	FCV8948A
018	FCV8948B
019	FCV8949A
020	FCV8949B
021	FCV8893A
022	FCV8893B

ATTACHMENT 1
AUTOMATIC DAMPER PERFORMANCE DATA SHEET
KRŠKO NUCLEAR POWER PLANT

	DAMPER	SHEET NO.: 001		
1.	TAG NO.	FCV 8900A		
2.	SAFETY CLASS	NSR/AQ		
3.	SEISMIC CATEGORY	I		
4.	LOCATION (ELEVATION)	OSC, below 106.20		
5.	DUCT SIZE W x H (mm)	Ø630		
6.	DUCT ORIENTATION	horizontal		
7.	ACTUATOR POSITION			
8.	FUNCTION	bubble tight		
9.	FRAME LEAKAGE CLASS	A		
10.	SEAT LEAKAGE CLASS	zero leakage		
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m ³ /h)	---	10200	10200
2.	VELOCITY (m/s)	---	9.1	9.1
3.	TEMPERATURE AT FLOW (°C)	-35.1	Varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)			100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)	electric		
5.	OPERATING MODE	on/off		
6.	INPUT CONTROL SIGNAL (mA)	N/A		
7.	POWER SUPPLY (V/phase/Hz)	230/1/50		
8.	NEMA ENCLOSURE TYPE	4		
9.	MAXIMUM CLOSURE TIME (sec)	5		
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL	N/A		
11.	FAIL POSITION – LOSS OF POWER	close		
12.	ACTUATOR MANUAL OVERRIDE REQUIRED	yes		
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED	2		
2.	LIMIT SWITCH IEEE CLASS	N/A		
3.	ACTUATION POINTS	open, closed		
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 002	
1.	TAG NO.		FCV 8900B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 106.20	
5.	DUCT SIZE W x H (mm)		Ø630	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION			
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	10200	10200
2.	VELOCITY (m/s)	---	9.1	9.1
3.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 003	
1.	TAG NO.		FCV 8901A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	1700/3400	10200
2.	VELOCITY (m/s)	---	0.9/1.8	5.7
3.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5/10	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 004	
1.	TAG NO.		FCV 8901B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	1700/3400	10200
2.	VELOCITY (m/s)	---	0.9/1.8	5.7
3.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5/10	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 005	
1.	TAG NO.		FCV 8902A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	1700	10200
2.	VELOCITY (m/s)	---	0.9	5.7
3.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 006	
1.	TAG NO.		FCV 8902B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	1700	10200
2.	VELOCITY (m/s)	---	0.9	5.7
3.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 007	
1.	TAG NO.		FCV 8911	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		isolation	
9.	FRAME LEAKAGE CLASS		B	
10.	SEAT LEAKAGE CLASS		II	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	10200	10200
2.	VELOCITY (m/s)	---	5.7	5.7
3.	TEMPERATURE AT FLOW (°C)	5	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		10	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		open	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 008	
1.	TAG NO.		FCV 8920	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		isolation	
9.	FRAME LEAKAGE CLASS		B	
10.	SEAT LEAKAGE CLASS		II	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	10200	10200
2.	VELOCITY (m/s)	---	5.7	5.7
3.	TEMPERATURE AT FLOW (°C)	5	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		10	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		open	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 009	
1.	TAG NO.		FCV 8922	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1000 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		isolation	
9.	FRAME LEAKAGE CLASS		B	
10.	SEAT LEAKAGE CLASS		II	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	1700	10200
2.	VELOCITY (m/s)	---	0.9	5.7
3.	TEMPERATURE AT FLOW (°C)	5	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		10	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		open	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 010	
1.	TAG NO.		FCV 8923	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1200 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		isolation	
9.	FRAME LEAKAGE CLASS		B	
10.	SEAT LEAKAGE CLASS		II	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	18700	20400
2.	VELOCITY (m/s)	---	8.7	9.4
3.	TEMPERATURE AT FLOW (°C)	5	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		10	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		open	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 011	
1.	TAG NO.		FCV 8938	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		1200 x 500	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		isolation	
9.	FRAME LEAKAGE CLASS		B	
10.	SEAT LEAKAGE CLASS		II	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)		10200	20400
2.	VELOCITY (m/s)		4.7	9.4
3.	TEMPERATURE AT FLOW (°C)	5	Varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)		10	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	2250	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	4400	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	10	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		10	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		open	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER	SHEET NO.: 012		
1.	TAG NO.	FCV 8942		
2.	SAFETY CLASS	NSR/AQ		
3.	SEISMIC CATEGORY	I		
4.	LOCATION (ELEVATION)	OSC, below 105.80		
5.	DUCT SIZE W x H (mm)	1200 x 500		
6.	DUCT ORIENTATION	horizontal		
7.	ACTUATOR POSITION	shorter side		
8.	FUNCTION	isolation		
9.	FRAME LEAKAGE CLASS	B		
10.	SEAT LEAKAGE CLASS	II		
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m ³ /h)		8500	17000
2.	VELOCITY (m/s)		3.9	7.9
3.	TEMPERATURE AT FLOW (°C)	5		46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)		10	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---		2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---		4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---		10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)	electric		
5.	OPERATING MODE	on/off		
6.	INPUT CONTROL SIGNAL (mA)	N/A		
7.	POWER SUPPLY (V/phase/Hz)	230/1/50		
8.	NEMA ENCLOSURE TYPE	4		
9.	MAXIMUM CLOSURE TIME (sec)	10		
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL	N/A		
11.	FAIL POSITION – LOSS OF POWER	close		
12.	ACTUATOR MANUAL OVERRIDE REQUIRED	yes		
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED	2		
2.	LIMIT SWITCH IEEE CLASS	N/A		
3.	ACTUATION POINTS	open, closed		
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 013	
15.	TAG NO.		FCV 8943A	
16.	SAFETY CLASS		NSR/AQ	
17.	SEISMIC CATEGORY		I	
18.	LOCATION (ELEVATION)		OSC, below 106.20	
19.	DUCT SIZE W x H (mm)		Ø355	
20.	DUCT ORIENTATION		horizontal	
21.	ACTUATOR POSITION			
22.	FUNCTION		bubble tight	
23.	FRAME LEAKAGE CLASS		A	
24.	SEAT LEAKAGE CLASS		zero leakage	
25.	MANUFACTURER (*)			
26.	MODEL (*)			
27.	NO. OF DAMPER SECTIONS (*)			
28.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
8.	FLOW (m³/h)	---	1700	1700
9.	VELOCITY (m/s)	---	4.8	4.8
10.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
11.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
12.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
13.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
14.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
13.	MANUFACTURER (*)			
14.	MODEL (*)			
15.	QUANTITY (*)			
16.	TYPE (POWER SOURCE)		electric	
17.	OPERATING MODE		on/off	
18.	INPUT CONTROL SIGNAL (mA)		N/A	
19.	POWER SUPPLY (V/phase/Hz)		230/1/50	
20.	NEMA ENCLOSURE TYPE		4	
21.	MAXIMUM CLOSURE TIME (sec)		5	
22.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
23.	FAIL POSITION – LOSS OF POWER		close	
24.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
4.	QUANTITY REQUIRED		2	
5.	LIMIT SWITCH IEEE CLASS		N/A	
6.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
2.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 014	
29.	TAG NO.		FCV 8943B	
30.	SAFETY CLASS		NSR/AQ	
31.	SEISMIC CATEGORY		I	
32.	LOCATION (ELEVATION)		OSC, below 106.20	
33.	DUCT SIZE W x H (mm)		Ø355	
34.	DUCT ORIENTATION		vertical	
35.	ACTUATOR POSITION			
36.	FUNCTION		bubble tight	
37.	FRAME LEAKAGE CLASS		A	
38.	SEAT LEAKAGE CLASS		zero leakage	
39.	MANUFACTURER (*)			
40.	MODEL (*)			
41.	NO. OF DAMPER SECTIONS (*)			
42.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
15.	FLOW (m³/h)	---	1700	1700
16.	VELOCITY (m/s)	---	4.8	4.8
17.	TEMPERATURE AT FLOW (°C)	-35.1	varies	46
18.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
19.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
20.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
21.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
25.	MANUFACTURER (*)			
26.	MODEL (*)			
27.	QUANTITY (*)			
28.	TYPE (POWER SOURCE)		electric	
29.	OPERATING MODE		on/off	
30.	INPUT CONTROL SIGNAL (mA)		N/A	
31.	POWER SUPPLY (V/phase/Hz)		230/1/50	
32.	NEMA ENCLOSURE TYPE		4	
33.	MAXIMUM CLOSURE TIME (sec)		5	
34.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
35.	FAIL POSITION – LOSS OF POWER		close	
36.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
7.	QUANTITY REQUIRED		2	
8.	LIMIT SWITCH IEEE CLASS		N/A	
9.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
3.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 015	
1.	TAG NO.		FCV 8947A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		250 x 200	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	805	805
2.	VELOCITY (m/s)	---	4.5	4.5
3.	TEMPERATURE AT FLOW (°C)	-35	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 016	
1.	TAG NO.		FCV 8947B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 105.80	
5.	DUCT SIZE W x H (mm)		250 x 200	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		shorter side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	805	805
2.	VELOCITY (m/s)	---	4.5	4.5
3.	TEMPERATURE AT FLOW (°C)	-35	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 017	
1.	TAG NO.		FCV 8948A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 101.00	
5.	DUCT SIZE W x H (mm)		700 x 300	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	660	6600
2.	VELOCITY (m/s)	---	0.9	8.7
3.	TEMPERATURE AT FLOW (°C)	5	Varies	40
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 018	
1.	TAG NO.		FCV 8948B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 100.20	
5.	DUCT SIZE W x H (mm)		700 x 300	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	660	6600
2.	VELOCITY (m/s)	---	0.9	8.7
3.	TEMPERATURE AT FLOW (°C)	5	Varies	40
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 019	
1.	TAG NO.		FCV 8949A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 101.00	
5.	DUCT SIZE W x H (mm)		700 x 300	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	660	6600
2.	VELOCITY (m/s)	---	0.9	8.7
3.	TEMPERATURE AT FLOW (°C)	5	varies	40
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 020	
1.	TAG NO.		FCV 8949B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 100.20	
5.	DUCT SIZE W x H (mm)		700 x 300	
6.	DUCT ORIENTATION		horizontal	
7.	ACTUATOR POSITION		longer side	
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	660	6600
2.	VELOCITY (m/s)	---	0.9	8.7
3.	TEMPERATURE AT FLOW (°C)	5	varies	40
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	5	20
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	10
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 021	
1.	TAG NO.		FCV 8893A	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 101.00	
5.	DUCT SIZE W x H (mm)		Ø250	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION			
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	895	895
2.	VELOCITY (m/s)	---	5.1	5.1
3.	TEMPERATURE AT FLOW (°C)	-35	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

	DAMPER		SHEET NO.: 022	
1.	TAG NO.		FCV 8893B	
2.	SAFETY CLASS		NSR/AQ	
3.	SEISMIC CATEGORY		I	
4.	LOCATION (ELEVATION)		OSC, below 101.00	
5.	DUCT SIZE W x H (mm)		Ø250	
6.	DUCT ORIENTATION		vertical	
7.	ACTUATOR POSITION			
8.	FUNCTION		bubble tight	
9.	FRAME LEAKAGE CLASS		A	
10.	SEAT LEAKAGE CLASS		zero leakage	
11.	MANUFACTURER (*)			
12.	MODEL (*)			
13.	NO. OF DAMPER SECTIONS (*)			
14.	WEIGHT (kg) (*)			
	SERVICE CONDITIONS	MINIMUM	NORMAL	MAXIMUM
1.	FLOW (m³/h)	---	895	895
2.	VELOCITY (m/s)	---	5.1	5.1
3.	TEMPERATURE AT FLOW (°C)	-35	varies	46
4.	PRESSURE DROP (WIDE OPEN) AT FLOW (Pa)	---	15	15
5.	DAMPER ASSEMBLY OPERATING PRESSURE (Pa)	---	---	2250
6.	DAMPER ASSEMBLY DESIGN PRESSURE (Pa)	---	---	4400
7.	CUMMULATIVE RADIATION DOSE (Gy)	---	---	100
	ACTUATOR DATA			
1.	MANUFACTURER (*)			
2.	MODEL (*)			
3.	QUANTITY (*)			
4.	TYPE (POWER SOURCE)		electric	
5.	OPERATING MODE		on/off	
6.	INPUT CONTROL SIGNAL (mA)		N/A	
7.	POWER SUPPLY (V/phase/Hz)		230/1/50	
8.	NEMA ENCLOSURE TYPE		4	
9.	MAXIMUM CLOSURE TIME (sec)		5	
10.	FAIL POSITION – LOSS OF CONTROL SIGNAL		N/A	
11.	FAIL POSITION – LOSS OF POWER		close	
12.	ACTUATOR MANUAL OVERRIDE REQUIRED		yes	
	LIMIT SWITCHES			
1.	QUANTITY REQUIRED		2	
2.	LIMIT SWITCH IEEE CLASS		N/A	
3.	ACTUATION POINTS		open, closed	
	FLOOR RESPONSE SPECTRA FROM 1056-NA-L-PZI-3/1-A1			
1.	APPLICABLE FLOOR RESPONSE SPECTRA: +3.55m at Roof Elevation (see Attachment 2)			

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 2 (nivo 2) 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” (+/-0,00 = altitude +157,85m a.s.l. = NEK altitude 102,650m):

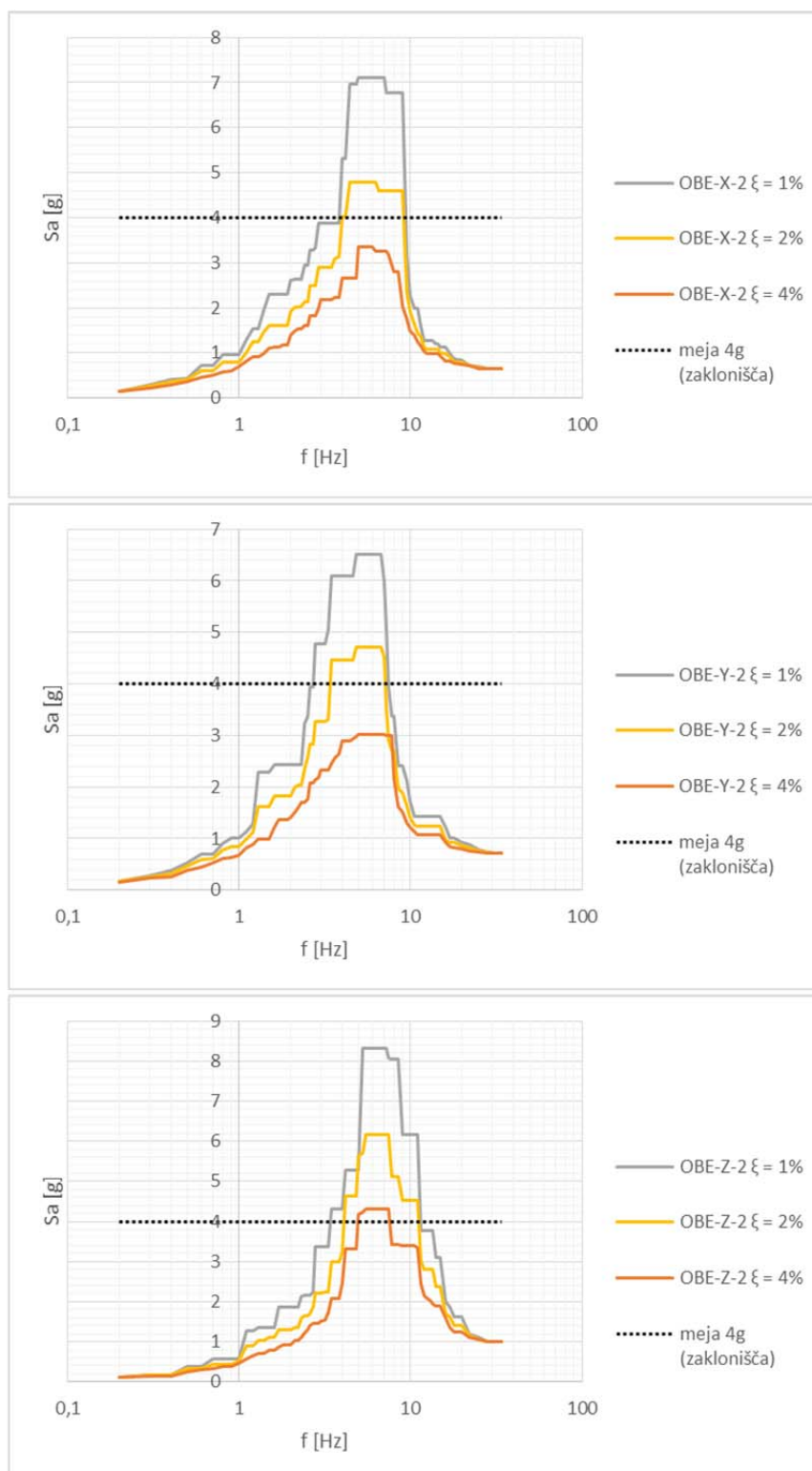
- Level 2 = Slab's axial elevation corresponds to (NEK altitude 106,200m);

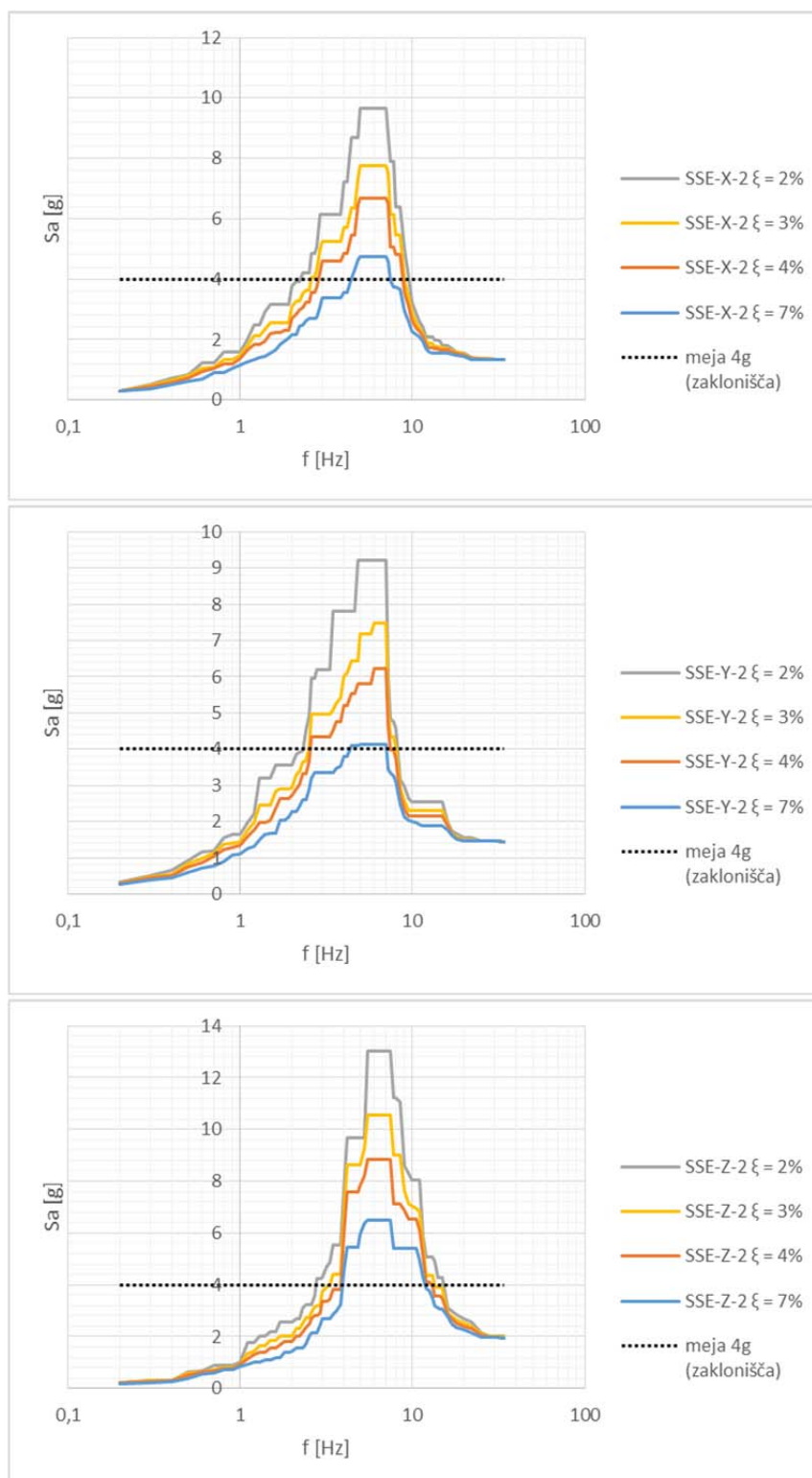
OPC building is considered as shelter, that is why there is a rule for minimum value of equipment accelerations (shown on each FRS chart as “meja 4g (zaklonišča)”):

- For higher levels (levels 1, 2, 3): $S_{a,min} = 4g$.

Included floor response spectra:

- OBE: Level 2 (Etažni spektri – OBE – nivo 2) for all directions and dampings (page 4 of Appendix A of Document OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1);
- SSE: Level 2 (Etažni spektri – SSE – nivo 2) for all directions and dampings (page 4 of Appendix B of Document OSC Seismic Analysis 1056-NA-L-PZI-3/1-A1).

- OBE: Level 2 (Etažni spektri – OBE – nivo 2)

- SSE: Level 2 (Etažni spektri – SSE – nivo 2)

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
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 5 EAM-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				