

TECHNICAL SPECIFICATION

SNUBBER TEST MACHINE

KRŠKO NUCLEAR POWER PLANT (NEK)

(Req. No. – 8260471)

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Augmented Quality

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1.0 SCOPE OF WORK

The purpose of this specification is to establish requirements for design, manufacture, testing and delivery of a new Snubber Test Machine for functional testing of mechanical and hydraulic shock absorbers (snubbers) installed at NEK. All kinds of snubber types/models, which are installed at the facility, are listed in Section 6.1 of this Specification.

1.1 Equipment, Material and Services to be furnished by Supplier

The equipment, material and services together with all accessories to be furnished by supplier shall include, but not necessarily be limited to, the following:

- a) Large test frame with capacity up to 75.000 lbf (75 Kip) and with all required snubber fixturing (pins and bushes) for “Pin to Pin” testing of all sizes stated in bulletin. 6.1,
- b) Small test frame with capacity up to 6.000 lbf (6 Kip) and with all required snubber fixturing (pins and bushes) for “Pin to Pin” testing of all sizes stated in bulletin. 6.1,
- c) Separate hydraulic power unit with all required connecting hoses,
- d) Separate computer control console (desk) including a Windows based control and data acquisition computer, data acquisition hardware, monitor, mouse, keyboard, color printer and all required interconnecting cables,
- e) Test Machine software,
- f) Acceptance testing (FAT),
- g) Operator training and Data Analysis Course at Supplier’s site,
- h) Startup of the Snubber test Machine and SAT,
- i) Maintenance and troubleshooting Training at purchaser’s site,
- j) A spare set of a complete computer control console with the identical computer equipment installed and all other identical equipment specified in Sec. 1.1-d,
- k) One set of recommended spare parts as designated in instruction manual for equipment stated in Sec. 1.1,
- l) O&M Manual and schematics for all electrical circuits (including instrumentation) and hydraulic circuits.
- m) Test machines shall be compatible (both mechanical and software wise) with other test benches that are currently in operation in NEK (proof provided by reference of implementation in other NPP-s) Machine shall be able to open old test results from benches which are currently in operation.

1.2 Items to be furnished by NEK

- a) Installation of required power supply at NEK,
- b) Installation of the Snubber Test Machine at the specified location at NEK,
- c) Supply of Hydraulic oil (type of hydraulic oil is defined by the supplier of the test machine).

1.3 Information Required with the Proposal

Complete operating data and a description of the equipment offered shall be submitted with the Proposal. This data shall include the following:

- a) Overview of the Snubber Test Machine,
- b) Dimensional outline drawings of the Snubber Test Machine,
- c) Technical specifications for Large Test Frame,
- d) Technical specifications for Small Test Frame,
- e) Technical specifications for hydraulic power unit,
- f) Technical specifications for Computer control console,
- g) Instrumentation accuracies,
- h) Warranty period,
- i) A reference list of customers identical or similar test equipment.
- j) A description of the QA program under which the work will be carried out and/or QA Manual.

2.0 DEFINITIONs

NEK	-	Nuclear Power Plant Krško
Bidder	-	One who proposes his goods or services with price at the public auction
Supplier	-	Equipment Supplier per this Specification
Purchaser	-	NPP Krško
SAT	-	Site Acceptance Test
FAT	-	Factory Acceptance Test
N/A	-	Not Applicable
EN	-	European Norms and Standards
QA	-	Quality Assurance
QC	-	Quality Control

3.0 CODES, STANDARDS AND REGULATORY REQUIREMENTS

3.1 Applicable Codes and Standards

- a) Equipment must be designed and constructed in accordance with the applicable Codes and Standards ,
- b) ASME OMb Code-1997, Addenda to ASME OM Code-1995; ISTD subsection.

4.0 SUPPLEMENTAL DATA

Supplier shall provide information about spare parts assurance period. It is expected to be at least 10 years.

5.0 DOCUMENT SUBMITTAL

5.1 Document submittal with the proposal

Defined in section 1.3.

5.2 Final Documentation – Documentation delivered with the equipment

- a) Certificate of Conformance,
- b) List of applicable Codes and Standards,
- c) Operation and Maintenance Manual (per Section 33),
- d) A digital copy of all required computer software,
- e) Software Verification and Validation Plan and Report,
- f) The “valid” calibration certificates for components they shall be calibrated (e.g. Load cells),
- g) FAT report.

Note: The Supplier shall submit 4 x hard copy + 4 x digital copy of the final technical documentation!

5.3 Additional Requirements

All Supplier's documents shall bear at least the following identification:

- a) Supplier Name,
- b) Date of issue,
- c) Document number,
- d) Revision number,
- e) Construction Code and Standard,

- f) Other organizations participating in the manufacturing,
- g) NEK's Order Number.

6.0 DESIGN REQUIREMENTS AND DESIGN INPUTS

6.1 As a minimum, the test machine shall be capable of testing the below-listed Snubber models with the rated loads from 350 lbf to 70000 lbf (70 Kip):

a) Pacific Scientific (Basic-PSA) Snubber Models (Both NF and Pre-NF)

- PSA-1/4; 4" Stroke
- PSA-1/2; 2 1/2" Stroke
- PSA-1; 4" and 8" Stroke
- PSA-3; 5" and 10" Stroke
- PSA-10; 6" and 12" Stroke
- PSA-35; 6" and 12" Stroke

b) Basic Engineers (Basic-PSA) Hydraulic Snubbers (BE)

- 3/4" Bore; 5" and 10" Stroke
- 1" Bore; 5" and 10" Stroke
- 1 1/2" Bore; 5" and 10" Stroke
- 2" Bore; 5" and 10" Stroke
- 2 1/2" Bore; 5" and 10" Stroke
- 3 1/4" Bore; 5" and 10" Stroke
- 4" Bore; 5" and 10" Stroke
- 5" Bore; 5" and 10" Stroke
- 6" Bore; 5" and 10" Stroke

c) Lisega Shock absorbers (Hydraulic Snubbers)

- 30 18 16/56 and 100 mm stroke
- 30 38 16/56 and 100 mm stroke
- 30 39 16/56 and 200 mm stroke
- 30 42 16/56 and 150 mm stroke
- 30 43 16/56 and 300 mm stroke
- 30 52 13/53 and 150 mm stroke
- 30 53 13/53 and 300 mm stroke
- 30 62 16/56 and 150 mm stroke
- 30 72 16/56 and 150 mm stroke

- 30 82 16/56 and 150 mm stroke
- 30 83 16/56 and 300 mm stroke

6.2 The Snubber Test Machine shall have two separate Test Frames for functional testing of Mechanical and Hydraulic Snubbers as follows:

a) 75 kip Test Bench with the following capacities/performance:

- Maximum Load (activation testing) 75000 lbf
- Minimum Load (activation testing) 5000 lbf
- Maximum Pin-to-Pin dimension 65 inches
- Maximum stroke length 14 inches
- All required snubber fixturing (pins and bushes) for “Pin to Pin” testing of Mechanical and Hydraulic Snubbers with larger Rated Loads (Required dimensions for Pins/Bushings: 0.750”; 0.875”; 1.000”; 1.250”; 1.500”; 1.750”, 2.000” and 2.500”)
- Interconnect Hoses/Cables
 - Hoses (aprox) 7,5 m (25 feet)
 - Electrical Cables (aprox) 7,5 m (25 feet)
- Overall Max. Size (aprox): Length x Width x Height – 510 x 120 x 130 {cm}

b) 6 kip Test Bench with the following capacities/performance:

- Maximum Load (activation testing) 6000 lbf
- Minimum Load (activation testing) 150 lbf
- Maximum Pin-to-Pin dimension 45 inches
- Maximum stroke length 14 inches
- All required snubber fixturing (pins and bushes) for “Pin to Pin” testing of Mechanical and Hydraulic Snubbers with smaller Rated Loads (Required dimensions for Pins/Bushings: 0.3750”; 0.500”; 0.625”; 0.750”; 0.875” and 1.000”),
- Interconnect Hoses/Cables
 - Hoses (aprox) 9,5 m (approx 31 feet)
 - Electrical Cables (aprox) 8,5 m (approx 28 feet)
- Overall Max. Size (aprox): Length x Width x Height – 360 x 120 x 130 {cm}

6.3 Separate hydraulic power unit with all required connecting hoses (required length of hydraulic hoses from Power Cabinet to each Test Frame is min. 8 m); Max. external dimensions (Aprox.): Length x With x Height – 230 x 110 x 140 {cm}

6.4 The Snubber Test Machine shall be built in accordance with the Section 3 defined Codes and Standards.

- 6.5 The test machine frame must be of a concentrically loaded design to avoid instrument deflections under high load conditions. "I beam" designs with off axis mounting of drive cylinders, instrumentation, and snubbers are not acceptable.
- 6.6 The test machine shall include overload protection that will eliminate the possibility of snubber overload during testing and set up. The supplier shall provide, with their proposal, a description of how this protection shall be provided.
- 6.7 The Snubber Test Machine shall be equipped with all necessary controls, instruments indicators, alarms and other safety features to assure reliable and safe operation.
- 6.8 Safety features
- The Power Cabinet and each Test Bench must have a built-in Emergency STOP switch, which will not turn off the computer when the Emergency STOP is pressed.
 - A Test Bench must be constructed in such a way that the moving plate during an Auto Exercise mode (e.g. heating phase) cannot damage somebody if grabs a rod between the front fixed plate (frame of the machine) and the plate, which is moving back and forth.
 - When the button "Start Test" is pressed by the computer operator an audible warning and a red flashing light must be automatically activated as a warning that testing takes place. Green light is turned on when it is safe to approach Test bench (Test Bench is turned ON but not in test mode)

6.9 Manual Operation

Provisions shall be included for manual operation of the test machine. This applies to manual position control during set-up for installing the snubber and manual control for diagnostics. Manual control for diagnostics shall provide for direct control of all instrumentation input signals and direct control of all signals used to control electrical and hydraulic components.

- 6.10 All required pins and bushings for mounting snubbers in the test bench must be included. Pins and bushings for Basic Engineers (Basic-PSA) Snubbers and Lisega Snubbers are the same size.

6.11 Instrumentation

6.11.1 Load Measuring Instrumentation

Load measuring instrumentation with TEDs equipped shall be of sufficient accuracy that the associated test parameter may be accurately measured. For load measuring instrumentation that is used to measure drag force, the effect of side loading (due to the weight of the snubber) on measured force shall be accounted for.

6.11.2 Velocity or Displacement Measuring Instrumentation

- Displacement measuring instrumentation shall be capable of measuring displacement for the entire stroke of the snubber.
- Velocity measuring instrumentation shall be capable of accurately measuring velocities ranging from 0.1 to 400 ipm.

6.12 Data Display and Recording

6.12.1 Digital Display

The test machine shall include digital displays for monitoring load and velocity. These displays shall include a peak hold feature that holds the peak value of the parameter measured until reset.

6.12.2 Data Recording

- As a minimum, the test machine shall provide time-based or position-based recordings (plots) of load and velocity during all tests. Data recordings and associated data scales shall be such that the magnitude of the parameter (load or velocity) may be accurately determined.
- Data recordings shall encompass the entire test duration, i.e., the range over which test parameters are required to be measured.

6.13 Signal Conditioning

If signal conditioning (filtering) is used, the signal conditioning shall not alter the signal such that critical transition points, e.g., activation, load spikes, etc., cannot be readily detected.

6.14 Computer Requirements

- The computer system shall meet the following specifications:
 - Computer Type: Windows/HP
 - Processor: Intel Core i7
 - Operating System: Windows 11 enterprise
 - Memory: 32 GB
 - Hard Drive: 2 TB SSD
 - Graphics card: Connection: Dual output (2 x HDMI, or 2 display port)
 - Monitor: min. 24" HD (1920X1200)
 - Printer: HP Color LaserJet Enterprise 5700dn or similar but compatible with NEK inhouse printer fleet (preferably without WI-FI and with ink cartridge compatible to EU zone) ; format: A4

Note: Standard electrical connection for PC and printer: 230V, 1ph, 50 Hz!

- The test machine shall have the capability to store all test data.
- A digital copy of all required computer software shall be provided with the test machine.

6.15 Cyber security requirements:

- Disable all unnecessary services
- Disable all unnecessary interfaces (e.g., Ethernet, Wi-Fi, Bluetooth, USB).
- Port Blocking – Physical Locking Devices for Unused Interfaces
 - a) For unused physical ports (e.g., USB, Ethernet), install hardware port locks to prevent unauthorized access or device connection.
 - USB Port Locks
Small plastic or metal inserts that fit into USB ports and can only be removed with a special key or tool. Prevents unauthorized use of USB drives, HID attacks, and malware injection.
 - RJ45 (Ethernet) Port Locks
Blocks access to LAN ports. Often used in secure facilities to prevent network access. Removal typically requires a unique unlocking tool.
 - SD Card / CompactFlash Locks
Useful on devices that support removable media but don't require them in daily operation.
- Disable automatic boot from external media via BIOS/UEFI settings.
- Establish at least two separate user groups with different permission levels:
 - a) Software Users
 - This group should have full access and privileges to operate the snubber testing software.
 - They must not have administrative rights or the ability to modify system configurations.
 - b) System Administrators
 - This group should have full control over the computer's configuration, including system settings, software installation, user management, and security policies.
 - They should not use the system for running the testing software during normal operations, unless necessary for administrative purposes.
 - c) Use strong passwords (15 characters)
 - d) Change default passwords
 - e) Remove/Disable unnecessary user accounts
- Windows Firewall – Recommended Configuration
 - a) Enable the firewall for all network profiles
 - Activate the firewall for:
 - Domain profile (if the computer is part of a domain)
 - Private network
 - Public network
- Because the system is isolated, it's best to configure it as a "Public network" for maximum protection.

- a) Default rule: block everything unless explicitly allowed
- Set the default policy to:
 - a) Inbound connections: Block (default)
 - b) Outbound connections: Allow (default) (or “Block” for high-security environments)
 - c) Allow only essential connections
 - Allow only specific applications or services that are strictly necessary (e.g., the measurement/testing software).
 - Create custom rules (by port, IP address, protocol), and avoid “Allow all” rules.
 - d) Disable unnecessary Windows services
 - If not required, disable:
 - Remote Desktop (RDP)
 - File and Printer Sharing
 - Windows Remote Management (WinRM)
 - SMB protocols (if network file sharing isn’t needed)
 - e) The supplier shall create a golden copy backup of the system after the final configuration has been completed (i.e., once the system has been tested and is ready for operational use). This backup should include a full system image, configuration files, and any critical data required to restore the system to its operational state in case of failure.

6.16 Electricity service specification

The following electricity service is available at NEK:

- HPU 400/230 VAC / 3 phase, frequency is 50 Hz,
- The test machine shall be shipped ready for immediate connection and use with this service without modification of the test machine control unit, data management system, or HPU.

7.0 PERFORMANCE REQUIREMENTS

7.1 The Snubber Test Machine shall be capable of testing in Section 6.1 listed Snubber models with the rated loads from 350 lbf to 70,000 lbf.

7.2 Machine performance minimum specifications:

The test machine shall be capable of measuring the parameters discussed in Sections 7.2.1 through 7.2.4. If the test machine is designed for automatic testing, a provision shall be included that will allow for adjustment of the following controlled test parameters:

- Actuator velocity during drag force tests,
- Applied load during bleed rate tests and acceleration threshold tests,
- Actuator ramp rate during locking velocity and drag force tests.

Note: NEK will normally measure locking velocity at a ramp rate that is less than 2 ipm/second. The supplier shall include set up and software provisions that will ensure that this ramp rate will not be exceeded during testing unless specifically approved by the Snubber Program Coordinator (the person supervising the test machine operator).

7.2.1 Lockup Testing (Hydraulic Snubbers)

Machine must be able to ramp under no load conditions from 0 ipm to 75 ipm in a controlled and linear manner. The rate of change in velocity must be able to be user specified, and must cover the range of 1 ipm/sec to 6 ipm/sec.

The test machine instrumentation shall provide, as a minimum, a trace of velocity vs. time and a trace of load vs. time for the entire duration of the test. If the test machine has software that is designed to calculate locking velocity, locking velocity shall be measured as velocity at the point of sudden load increase. This may be determined as the maximum velocity prior to attaining a specified load level.

7.2.2 Bleed Rate Testing (Hydraulic Snubbers)

Bleed rate tests shall be conducted by locking the snubber in either direction as described in Section 7.2.1 above and by applying a load specified by the user. This shall be accomplished by specifying a bleed rate test load range. If the test machine has software that is designed to calculate bleed rate, bleed rate shall be measured as the average of all velocity readings when the applied load is within the specified test load range.

Machine must be able to maintain full rated load at all speeds from 0.1 ipm to 40 ipm

Machine must be able to maintain a user specified load, from 10% to 100% of machine capacity, to within +/- 5.0% under constant velocity displacement.

The test machine instrumentation shall provide, as a minimum, a trace of velocity vs. time and a trace of load vs. time for the entire duration of the test. The test load reported on the snubber test report shall be the maximum load achieved during the

test. Bleed rate shall be calculated based on velocity measurements over a minimum duration of two seconds at the required test load.

7.2.3 Acceleration Testing (Mechanical Snubbers)

Acceleration threshold tests shall be conducted by stroking the snubber in either direction at an acceleration sufficient to activate the snubber. Following activation, a load, specified by the user, shall be applied to the snubber.

The machine must be able to meet or exceed an acceleration rate of 0.03g, at a minimum of 50% of snubber rated load or 3% of test bench capacity, whichever is greater, over a minimum of 0.5 seconds.

The test machine instrumentation shall provide, as a minimum, a trace of velocity vs. time and a trace of load vs. time for the entire duration of the test. If the test machine has software that is designed to calculate acceleration threshold, acceleration threshold shall be calculated as the change in velocity from the point of activation to the maximum velocity point divided by the time difference between the two points.

7.2.4 Drag Testing (Hydraulic and Mechanical Snubbers)

Velocity – Machine must be able to stroke over it's full stroke distance at a user specified velocity between 1 ipm and 6 ipm. Drag speed will be constant within +/- 0.2 ipm except as affected by varying snubber load.

The test machine instrumentation shall provide, as a minimum, a trace of velocity vs. stroke position and a trace of load vs. stroke position for the entire duration of the test. If the test machine has software that is designed to calculate drag force, both peak drag force and average drag force shall be calculated. Peak drag force shall be calculated as the maximum measured force through the entire stroke range of the test. Average drag force shall be calculated as the average force value through the entire stroke range of the test.

Test machine shall maintain a 0.5 inch safety zone at each end of the snubber stroke during drag testing.

7.3 Instrument Accuracies:

<u>Load:</u>	6 kip bench	1 kip load cell (TEDs equipped)
		10 kip load cell (TEDs equipped)
	75 kip bench	2 kip load cell (TEDs equipped)
		100 kip load cell (TEDs equipped)

All load cell accuracies to be 0.1% fs Static Error Band – SEB is the band of maximum deviations of the ascending and descending calibration points from a best fit line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and non-return to MINIMUM LOAD.

<u>Velocity:</u>	(+/- 1% of reading) + (+/- 0.1 ipm)
<u>Position:</u>	+/- 0.1 inch

8.0 MATERIAL REQUIREMENTS

Material must be carefully selected, that construction of the machine and other installed equipment will not be subject to corrosion due to atmosphere and frequent cleaning with the means to remove contamination.

9.0 FABRICATION AND ASSEMBLY REQUIREMENTS

Components of specified Snubbers Test Machine shall be designed, fabricated, assembled and tested as an integrated unit at factory.

10.0 INSPECTION AND TEST

10.1 The Supplier shall ensure that equipment furnished under this specification conforms to the requirements of applicable standards and procurement requirements by appropriate evaluations, functional tests, inspections and other activities (which the Supplier considers necessary to ensure that the design, material and workmanship are satisfactory for the service intended, or as may be required by common usage or practice).

10.2 FAT Requirements - Prior the Snubbers Test Machine shipment the Supplier shall perform FAT (by qualified and certified personnel) to verify that fully assembled and integrated system adequately performs its functions per ordering requirements and applicable standards.

- The Supplier shall submit FAT plan and testing procedures for review by Purchaser prior implementation.
- Purchaser representatives will witness the FAT.

Note: For the purpose of Factory Acceptance Testing NEK will provide some Mechanical PSA, Hydraulic BE and Lisega Hydraulic Snubbers which will be pre-tested on the existing equipment at NEK.

10.3 Records of all test reports shall be delivered with equipment or attached to the final documentation package.

11.0 QUALIFICATION, PART CLASSIFICATION AND DOCUMENT TRACEABILITY

Snubber Test Machine shall be designed, manufactured and tested in accordance with the reference standards, which are listed in section 3.0 of these specifications and manufacturer's regulations.

All documents shall be at least traceable to the original NEK Purchase Order. Between individual documents must be the link, so that it is possible to trace documents.

12.0 CLEANING

Supplier's cleaning procedure shall be applied.

13.0 CORROSION PROTECTION/COATING

13.1 Metal parts shall be dry, free of weld spatter and mill scale and cleaned of dust, dirt, grease before any paint is applied.

13.2 All carbon steel surfaces shall be painted to protect against corrosion. Protective Coating System shall be as follows:

- DuPont ChromaBase Basecoat, and
- DuPont ChromaClear 2400S (Low VOC Multi-Purpose Clear)

13.3 Chromed and Galvanized parts and parts from stainless steel, brass, etc. shall not be painted.

14.0 MARKING AND IDENTIFICATION

The Supplier shall establish and maintain a system for the identification and control of materials, parts, and components.

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

Equipment that is subject of delivery to this specification shall be clearly marked with nameplates where necessary to assure proper and easy use.

15.0 PACKAGING, HANDLING AND STORAGE

Equipment shall be packed and prepared for shipment and storage in accordance with the manufacturer's standards and procedures and shall include:

- Tamper-evident packaging
- Require suppliers to use packaging that clearly shows signs of tampering or opening.
- Examples include:
 - Holographic seals with serial numbers
 - Tamper-evident tape (e.g., VOID tape)
 - Security seals that are destroyed or irreversibly marked when opened

Equipment and spare parts shall be packed in a manner to ensure safe arrival at the jobsite and protection during storage.

16.0 NONCONFORMING MATERIALS

Materials and items those are not in accordance with specification requirements, and applicable codes and standards invoked by this specification will not be accepted until approved by the Purchaser.

17.0 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.

Retention period shall be at least 5 years.

18.0 OTHER REQUIREMENTS

All drawings, data and technical documents submitted to NEK shall be in English or Slovenian language.

19.0 RIGHT OF ACCESS

Purchaser's Representative shall be allowed to 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 subsuppliers 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.

20.0 QA PROGRAM REQUIREMENTS

All work shall be performed in accordance with the Supplier/Contractor's Quality Assurance Program.

The Supplier shall submit, with the proposal, a description of the QA program under which the work will be carried out and/or QA Manual.

QA program should be consistent with the essential requirements of QS 610, rev.1 and ISO17025.

Based on the evaluation results of the QA program and QA assessment, the Supplier may be placed on the NPP Krško ASL.

The works shall be carried out in accordance with the contractor's QA Program, as well as technological and control procedures.

21.0 SPECIAL HANDLING

The Supplier shall specify special handling requirements and provide 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.

22.0 SHELF LIFE

The Supplier shall not ship any item that has less than five-year remaining shelf life at the time of shipment. Also, the Supplier shall provide shelf life data by one of the following methods: Expiration date or Cure date and material composition.

If the above requirements are not met the material will be shipped back to the Supplier at his response.

23.0 10CFR21 REPORTING

N/A

24.0 COMMERCIAL GRADE ITEM DEDICATION

N/A

25.0 SUPPLIER DOCUMENTATION REQUIREMENTS

Requirements for supplier documentation could be found under sections 5.0.

26.0 NEK PROPRIETARY DATA

NEK acknowledges that the proprietary interest in all of the drawings, designs, specifications, documents, information or know-how which may be furnished pursuant contract execution are sensitive and proprietary trade secrets of the contractor.

NEK agrees not to copy or disseminate any such software and/or design material other than for archival purposes within buyer's own organization.

27.0 NON-CONFORMANCE REPORTS

Nonconformances with specification requirements, approved drawings, and applicable federal, state, and local codes and standard invoked by this specification will not be accepted until approved by the Purchaser.

Nonconformances to be reported for approval by the Purchaser are those nonconformances, 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.

Additionally, the Supplier shall:

- a. Segregate the nonconforming item to prevent any further processing which may result in a change of the nonconformance as identified,
- b. Properly disposition and transmit the NCN to the Purchaser's Responsible Engineer by the most expeditious means. The NCN may be telecopied, followed by direct transmittal of the original.
- c. Provide technical justification if recommended disposition is "Accept-As-Is" or "Repair".

The resolution/approval of Deficiency Notices, Nonconformance Notices, Field Change Notices, etc., must be approved in advance by the Purchaser. Further engineering and/or manufacturing after detection of nonconformances, prior to Purchaser's approval shall be at the Supplier's risk.

The NCR shall provide the method by which the Supplier shall obtain a documented response and approval from Purchaser when nonconformances are identified. The use of the NCR will pertain to work at the Supplier's and/or subsupplier's shops.

28.0 REPAIR RECORDS

Together with the documentation package shipment the Supplier shall provide the PURCHASER with all generated repair records and they shall include the following information as a minimum when it is returned to Purchaser:

- a. Summary of repair/refurbishment work that has been performed on the item(s).
- b. Brief analysis of the reason for failure of the item(s)
- c. Details of any "Special Processes" used during repairs that were not used during fabrication (i.e. motor rewind, functional tests, etc.)
- d. A list of replacement parts installed in the repaired item(s).

29.0 SOURCE INSPECTION/SURVEILLANCE NOTIFICATION

N/A

30.0 SHIPPING REQUIREMENTS

The shipping container/equipment shall be clearly tagged with the NEK identification number and the NEK unique number(s).

Material and all certifications or accompanying documentation under this order shall be directly shipped from the manufacturer to NEK. The import agent shall not take possession of material or documentation.

The Purchaser's authorized source inspector has right to hold the shipment if purchase order requirements are not met.

Supplier shall also provide Purchaser with packaging and shipping method(s) for protection of the equipment packages from the effects of temperature extremes, water shower, high humidity and in transit shocks and jarring.

31.0 DELIVERY SCHEDULE

Equipment according to this specification shall be delivered to the Purchaser latest six months after Purchase Order placing.

32.0 WITNESS/HOLD POINTS FOR SUBMITAL OF SUPPLIER DOCUMENTATION

N/A

33.0 VENDOR TECHNICAL MANUAL AND REGISTERED UPDATES

The Supplier shall furnish Technical Manual documentation covering:

- a) Overview of Snubber Test Machine
- b) Technical description of the Snubber Test Machine in sufficient details (to provide an understanding of the functioning and general performance of affected components)
- c) Technical specifications & details
- d) Short term Storage instructions
- e) Installation instructions
- f) Step by step test operation
- g) Daily calibration check procedure
- h) Yearly calibration check procedure/Full calibration instructions
- i) Associated maintenance and diagnostics precautions, instructions and procedures
- j) Measures in case of detected deficiency (troubleshooting)
- k) Schematics for all electrical/instrumentation circuits and all hydraulic circuits
- l) BOM - Bill of Material / Equipment part list listing all:
 - Hydraulic parts,
 - Electrical parts,

- Instrumentation and hardware

Note: Part shall be identified by description, manufacturer's name, part number and specification (rating). Sufficient information shall be provided such that, if the part becomes obsolete, an alternative replacement part may be sought.

- m) Calibration documentation
- n) Data for computer control hardware/software
- o) Individual component cut sheets
- p) Recommended spare parts that should be kept on store.

34.0 TRAINING

34.1 Operator Training and Data Analysis Course

The scope of this contract shall include a minimum of three days of training at their facility for a minimum of six NEK personnel. The training shall consist of hands-on instruction in all aspects of test machine set up, snubber installation and removal, test operation, interpretation of test reports, trouble shooting for Basic-Engineers hydraulic Snubbers, Pacific Scientific mechanical Snubbers, Lisega Snubbers and also other types. The training shall also include all information required for installation of the test machine at NEK. Manuals, diagrams, and other documents shall be provided for all points covered in the training. Upon completion of the training, NEK personnel shall be capable doing the following without on-site assistance from the supplier:

- Installation of the test machine at NEK,
- Set up of the test machine for conducting all required functional tests,
- Operation of the test machine during installation, testing, and removal of the snubber,
- Use of the associated test software,
- Interpretation of test reports,
- Troubleshooting.

Note: The Operator Training and Data Analysis Course shall be performed on the New Snubber Test Machine immediately after the FAT will be completed.

34.2 Maintenance and Troubleshooting Training Course at NEK

The supplier's price shall include a minimum of three days of training at NEK for a minimum of six mechanical, electrical, and I&C maintainers with the following Learning objectives:

- Operation of the test machine during installation, testing, and removal of the snubber,
- Use of the associated test software,
- Interpretation of test reports,

- Preventive maintenance of equipment in accordance with the O&M,
- Measures in case of detected deficiency (troubleshooting),
- Corrective maintenance.

Note: As part of training will also be installing spare computer system, in order to verify the operation of the Snubber Test Machine.

35.0 ATTACHMENTS

N/A