Bhabha Atomic Research Centre

Atomic Fuels Division

Engineering Services and Automation Section

Ref.AFD/ESAS/VP/21/ I/8551 **Date :** 10/12/2021

Sub: Tender enquiry for Supply, Installation, Testing and Commissioning of Public Address (PA) System for AFD General Workshop, South Site, BARC, Trombay.

Sealed offer is invited on printed letter head for and on behalf of The President of India, for **"Supply, Installation, Testing and Commissioning of Public Address (PA) System for AFD General Workshop, South Site, BARC, Trombay".** the scope of work, technical and general terms and condition given in Annexure-I.

1. This tender will be processed in **Two-Part Bid System**.

2. The tender submitted should have two separately sealed envelopes viz.

   2.1 First Envelope shall contain **Technical Bid (Part-A).** Technical Bid (Part-A) must be written on the Envelope.

   2.2 Second Envelope shall contain **Commercial Bid (Part-B).** Commercial Bid (Part-B) must be written on the Envelope.

3. The sealed Technical Bid (Part-A) shall contain Technical details of the offer and compliance with respect to our technical requirement, clearly mentioning deviations, if any.

4. The sealed Commercial Bid (Part-B) shall contain the detailed quotation including basic cost, applicable taxes and commercial terms and conditions.

5. **Sealed envelopes of Technical Bid (Part -A) and Commercial Bid (Part -B) shall be kept in Single Sealed Cover/Envelop, which shall be treated as your offer against our enquiry.**

6. Offers received as (i) technical and commercial parts in one bid, or (ii) technical and commercial bids in single envelope, or (iii) unsealed bids will be treated as invalid and no further communication will be made to the vendor.

7. Your offer in sealed envelope bearing **"Tender Enquiry No. & Due Date"** should be sent to the following address, so as to **reach on or before 24/12/2021 by Registered/Speed post only.**

   To,
   Smt. Vaishali Patidar,
   Technical Officer (C)
   Atomic Fuels Division
   Bhabha Atomic Research Centre, Mumbai -400085

8. **Offer received through courier or person will be treated as invalid.**

(Vaishali Patidar)
TO/C, ESAS/AFD

(S.K. Jha)
Head, AFD, BARC

Annexure-I

Specifications of Supply, Installation, Testing and Commissioning of Public Address (PA) System for AFD General Workshop, South Site, BARC, Trombay Public Address System

1. Technical Details

Design, manufacture, assembly, inspection, testing, installation and commissioning of Public Address System equipments at site as per the details give in the following paragraphs.

Applicable standards

- IS 1301 - Code of safety requirements for electrical mains operated audio amplifier.
- IS 1490 - Recommendations for minimum performance requirements of mains operated public.
- IS 1819 - Recommendations for general requirements of PA amplifiers.
- IS 1881 - Code of practice for installation of indoor amplifying and sound distribution system.
- IS 2382 - Mounting dimensions of loudspeakers.
- BS 5839-8 – Code practice for the design, installation and servicing of voice alarm system.
- IEC 60849 – Sound systems for emergency purposes
- BS EN 54 -16 Voice control indicating equipments and alarms

1.1 Brief Description of system:

Public address system is envisaged for normal announcement as well as during emergency conditions. Announcements shall be made through call stations, located in various rooms/corridor etc. There shall be 40W and 10W capacity loud speakers with wall mounting, as indicated in schedule of quantities. The details of the work are indicated in the enclosed schedule of quantities. Electronic components shall be industrial grade or better and suitable for tropical environment of Mumbai sea area.

1.2 Environmental Parameters: Following environmental parameters are considered during design of electrical and allied services:

Sr. No.	Parameter	Values
1.	Temperature	Maximum 50^{o}C
2.	Relative Humidity	Maximum 90%
3.	Altitude	Mean sea level

The PA system is required for AFD General Workshop. The system shall consist of following items:

a) Mounting Rack (15U size) as per specification of mounting rack.

b) Amplifier (325W- 2 Nos,)

c) Controller Unit

d) Trigger Input Device

e) Digital Player

f) USB Media Source

g) Accessories required for installation of the above

1.3 Amplifiers

Features of the Amplifiers shall be as follows:

1.3.1 Amplifier of rating 300W with 70V/100V low impedance outputs, temperature controlled fan, Line input with priority switching. The amplifier shall have protection against over load, short circuit and over-heating protection. The output of amplifier shall be 100V/8 ohm or 70V/4ohm power out.

1.3.2 The amplifier shall be 19" rack mounting type and provided with temperature controlled fans and low acoustic noise (48db SPL @1mt).

1.3.3 Output power –300W (rms) or more

1.3.4 Frequency Response – 50 Hz to 20 KHz (Typical).

1.3.5 Distortion <1% @ rated output power, 1 KHz S/N > 90db at full volume.

1.3.6 CMRR for line inputs > 25 dB for complete frequency range

1.3.7 LED indication for supervised functions i.e. power, audio output level, battery operation, pilot tone, overheat etc. Suitable for operation on 230V AC+/- 10%, 50 Hz and 24V DC +/- 15%.

1.3.8 Relay output for supervised functions.

1.3.9 Line Input & Loop output with priority control, 100 V line input for remote amplification.

1.3.10 Optional input for 24V back up power connection.

1.4 Basic Control Unit: -

Features of the Basic control unit Amplifiers shall be as follows:

1.4.1 Design of components of controller as per IEC 60849.

1.4.2 Full system supervision including line impedance supervision for speaker loop.

1.4.3 Provision for power amplified to speaker loops in 6 zones or more (Refer schematic drawings for PA system).

1.4.4 Provision for supporting 8 cell station with RJ45 connector. (Call station wiring with CAT-% Cable looped in series).

1.4.5 System configuration compatibility with PC and support for RS 485/mod bus communication to our control room.

1.4.6 Priority feature for call station, telephone instrument, Back Ground Music source and triggered inputs from fire alarm panel /building management. (Minimum 16 priority levels shall be provided).

1.4.7 Independent inbuilt line isolation transformer for generating 70-100V voltage for each zone (min. 6 transformer).

1.4.8 Controller inputs shall have provision for call station, telephone interface unit, MIC and emergency announcement.

1.4.9 Control unit shall be provided with manual Volume control, Bass and treble control, LED display for voice signal output etc.

1.4.10 Provision for interconnection with existing Fire alarm panel as shown in schematic drawing. The bidder shall provide all necessary hard ware, software to facilitate the same operation.

1.4.11 Microphone port with a switch for testing of amplifiers.

1.4.12 Press to siren switch to siren tone, to siren tone shall be heard on all speakers in emergencies.

1.4.13 Potential free spare contacts for power supply failure, amplifier failure etc to be provided.

1.5 Back Ground Music System (BGM system):

This system shall consist of Digital Media player with IR remote control, operating on 230V ± 10% LCD display of compact size. This system should have industrial design and automatically play MP3/DVD/JPEG formats. The output (Sound Level) of the DVD player should be adjustable and it should be 19" rack mounting type. This PA system should be provided with necessary ports, hardware to couple with a Back ground music source for back ground music system and music is muted in case of announcement and restored after the announcement is over.

1.5.1 Suitable Junction boxes with required gland to be used before the Final termination & Junction location.

1.5.2 All cable used for should be Armoured Low Smoke cable of Brand like Polycab or Finolex.

1.5.3 Suitable wall mount Powder quoted metallic enclosure should be provided for Call Station.

1.5.4 Trigger input for playing the emergency messaging to be provided.

1.6 Speaker system:

1.6.1 40W (Horn Type /Projector type Wall Mounted) speaker:

40 Watt speaker high quality fidelity and intelligibility housed in aluminium with ABS with line Matching transformer, 1 mtrs extension cord and shall be wall mounted type.

Features of the speaker shall be as follows

Rated Power: 40 W

Input Line voltage: 70 – 100 V

Volume Control: - YES

Sensitivity: 126 +/- 3 dB or more

Frequency response: 150 Hz – 18 KHz

Dimension: as per supplier standard

Colour: as per supplier standard

1.6.2 10 Watt wall mounted speaker:

10 Watt wall mounted speaker made of ABS plastic material along with flush mounting Box of same material (flush type design)

Rated Power: 10 Watts RMS

Line voltage: 100V

Sound level at 6 W: 96dB

Frequency response: 92 Hz to 18 KHz.

Volume control: - YES

Colour: white (RAL 9010)

All speakers should have built in protection to ensure that in event of a fire, damage to the loud speaker does not result in failure of the circuit to which it is connected. The speakers should have ceramic terminal block, thermal fuse and heat resistant, high temperature wiring.

1.7 Mic Call station with Suitable Wall Mount Housing Enclosure:

6 zone or more call station housed in a metal base, design, a flexible microphone and a uni directional condenser for announcing in 1 to 6 Zones or all zones basis. Volume control in various zones, micro phone status (active, fault and emergency) etc should be identified with LED's on call station board.

Voltage range: - 18 – 20 V

Frequency response: 100 Hz – 16 KHz

Speech filter: -3 DB @ 315Hz, High pass (6dB/oct)

Nominal sensitivity: 85 Db SPL

Nominal Output level: 700mV

Current consumption: < 30mA

The call stations shall be interconnected by cat -6 cable and the complete call station shall be flushed inside the wall by placing this inside a 2 mm. thick, M.S. powder coated after 7 tank treatment Box of size 300mm (W) X 500mm (H) X 120mm (D) with hinged door and magnetic lock type (sample Box shall be got approved before mass fabrication). The cost of the housing shall be included in the cost of call station.

2 Nos. RJ 45 connectors shall be provided inside the M.S. Box 9 at top of the Box) in a factory made connector Box with cover plate in a neat and clean fashion and 2 Nos. 3 Ft cord shall be connected from call station to these RJ 45 connectors.

The Call station shall derive power supply derived from the rack compatible with above system. It should have provision to initiate emergency alarm to all speakers, and it should have compatible pre amplifier to drive rack-based amplifiers.

1.8 Schedule of Quantity

Sr.No.	Name of items	Qty
a.	Supply, Installation, Testing and Commissioning of 40watt Horn Speaker	5 Nos.
b.	Supply, Installation, Testing and Commissioning of 10watt wall mounted speaker	5 Nos
c.	Supply, Installation, Testing and Commissioning of 325W Power Amplifier	2 Nos.
d.	Supply, Installation, Testing and Commissioning of Digital PA Controller	1 set.
e.	Supply, Installation, Testing and Commissioning of Digital mic console and wall mount powder coated enclosure type Mic stand	6 Nos.
f.	Supply, Installation, Testing and Commissioning of Equipment Rack	1 No.
g.	Supply, Installation, Testing and Commissioning of 1 Sqmm 2 core twisted pair, stranded Armoured FRLS Cable with all accessories	400 mtrs
h.	Supply, Installation, Testing and Commissioning of Cat 6 Armoured FRLS cable with all accessories	300 mtrs

1.9 Installation, Pre-commissioning, Testing and commissioning of equipments

1.9.1 All CAT -6 cables/ wires from different call stations / loud speakers shall be brought to a terminal box / PA Rack, as per schematic drawing.

1.9.2 Suitable Junction boxes with required gland to be used before the Final termination & Junction location

1.9.3 All cable used for should be Armoured Low Smoke cable of Brand like Polycab or Finolex.

1.9.4 Suitable wall mount Powder quoted metallic enclosure should be provided for Call Station

1.9.5 Trigger input for playing the emergency messaging to be provided

1.9.6 All the components used for this work shall be of reputed make.

1.9.7 Contractor has to submit list of bought-out items indicating their specification, make, source, and calibration certificates.

1.9.8 The Contractor shall at minimum have the following test equipment available onsite during installation and testing: -

1.9.9 Cable insulation and continuity tester;

1.9.10 Pink noise generator;

1.9.11 Sound level meter;

1.9.12 Oscilloscope

1.9.13 Calibrated microphones

1.9.14 Care shall be taken to separate the line level signal with the speaker circuit and with the mains.

1.10 Test Certificates/Instruction Manuals

Two sets of test certificates; two sets of final drawings and two sets of operation and maintenance instruction manual shall be supplied along with the equipment. Manual shall incorporate description of the system, operating instructions, fault finding chart, bill of material and one set of final drawings along with reproducible etc

1.11 Particulars to be furnished along with the tender

The tenderer shall furnish the following details/particulars along with the tender.

1.11.1 Make, model, rating, specifications, internal circuit diagram pamphlets, drawings etc.

1.11.2 Schematic diagram indicating the scheme of operation and brief write up.

1.11.3 Any other items and components which are necessary for satisfactory operation of PA system which are not covered in this specifications.

1.11.4 List of accessories provided with each unit.

1.11.5 Guaranteed technical particulars of individual components of PA system like amplifier, telephone interface unit, call station, speakers, etc.

1.12 Inspection and testing at manufacturer's works

1.12.1 Visual inspection

1.12.2 Gain of amplifier, frequency response, input impedance, output impedance, hum and noise level, distortion, frequency response etc.

1.12.3 Functional and interlocking checks.

1.12.4 Operation and switches, clamps, hooter, push buttons etc.

1.12.5 Performance with +10% supply variation

1.13 Test at Site

After installation of complete system, pre-commissioning checks, test and commissioning tests shall be carried out for all equipments to meet the functional and performance requirements.

1.14 Manufacturer's Drawings

After receipt of the purchase order, manufacturer shall submit two sets of drgs. to the purchaser for scrutiny and approval. Manufacture should not be taken up unless approval is accorded to the drawings by the purchaser. Drawings to be submitted are general arrangement, control schematic, terminal block connection diagram and bill of material (giving component designation, rating, make and type number). One set of reproducible of all final drawings shall be supplied after final inspection of the equipments.

1.15 Labour and Supervision

Contractor shall employ men known to be reliable and competent for the work in general, for unloading at site, completion, erection, testing, commissioning and demonstration of performance guarantee and any other service required for placing the equipments into the satisfactory regular operation.

2 General terms and conditions:

2.1 Offer evaluation procedure: - Only Valid Technical bids will be opened first and evaluated Commercial bids of only technically qualified vendors' will be opened and the lowest quoted offer shall be recommended for placing the work order

2.2 Only Lump sum prices to be quotated in Commercial Bid (Part – B).

2.3 The completion period of this job should be within 2 months from the date of issue of work order.

2.4 Payment shall be made only on satisfactory completion of the work and on production of bill, advance stamped receipt and guaranty/warranty certificate. Advance/ part payment or against delivery cannot be made. Proposed payment terms by the tenderer cannot be accepted.

2.5 Income Tax and GST IT as applicable will be deducted from the bill.

2.6 Any delay which is attributed to the contractor is liable for penalty @0.5 % Per Week (Max 10%).

2.7 The scope of work includes SITC of PA System. All materials, consumables, labour etc. required for accomplishment of the work shall be in Contractor's scope of work. Hence, the Contractor shall take comprehensive responsibility for the execution of work. Contractor shall arrange all tools and safety switchgears requires for execution of this work.

2.8 Please note that minor related works such as removal of false ceiling sheets, cutting of MS

trench covers for works and refixing of the same with required modification if any, making surfaces good and painting after fixing of supports/boxes, panel etc., providing required tools, ladders, safety belts, test instruments etc. required for the work are in the scope of the contractor without any additional cost.

3 Details and Confidentially & Publicity Clause

3.1 No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.

This clause shall apply to the sub-contractor, consultant, adviser or employees engaged by a party with equal force

3.2 "**Restricted information" categories under section 18n of the Atomic Energy Act, 1962 and "Official Secret under Section 5 of the Official Secret Act, 1923: -**

Any contravention of the above-mentioned provisions by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequence under the aforesaid legislation.

3.3 Prohibition against use of BARC's name without permission for the publicity purpose:

The contractor, sub-contractor, consultant, adviser or the employees engaged by the contractor, shall not use BARC's name for any publicity purpose through any public media like press, Radio, T.V. or Internet without the prior written of BARC. Contractor shall obtain Police verification certificate for all his employees including his supervisors and workers engaged in the work.

(Vaishali Patidar)
TO/C, ESAS/AFD