TECHNICAL SPECIFICATIONS

PUBLIC ADDRESS SYSTEM

The voice alarm system shall be the integrated solution for BGM (Background Music) and EVAC (Emergency Voice Alarm). The voice alarm system shall be designed for public address and emergency evacuation. All the essential EVAC functionality – such as system supervision, spare amplifier switching, loudspeaker line surveillance, digital message management and a fireman's panel interface – shall be combined.

A 24Vdc output shall be available to supply power to external relays, so no external power supply shall be required for that purpose. A LED VU-meter shall allow for monitoring of the master output.

The maximum/rated output power of the internal booster shall be 150 W / 300 W. max mains inrush current shall be 8A @ 230 VAC / 16A @ 115 VAC

The frequency response shall be 60 Hz – 18 kHz (+1/-3 dB, @ -10 dB ref. rated output. The distortions shall not exceed 1% at the rated output, 1 kHz. The controller shall have tone controls to allow for adjustment of the BGM sound. It shall have separate bass and treble controls. The controller shall have two BGM source inputs and a mic/line input with configurable priority, speech filter, phantom power and selectable VOX activation.

The operating temperature range shall be -10°C to +55°C. The storage temperature range shall be -40°C to +70°C.

The system shall comply to the following standards:

- EVAC compliance acc. to IEC 60849
- EMC emission acc. to EN 55103-1
- EMC immunity acc. to EN 55103-2
- Safety acc. to EN 60065

The system shall be the Bosch Plena Voice Alarm System.

The controller shall be the Bosch Plena Voice Alarm Controller 1990/00.
The router shall be the Bosch Plena Voice Alarm Router 1992/00.
The call station shall be the Bosch Plena Voice Alarm Call Station 1956/00.
The call station shall be the Bosch Plena Voice Alarm Call Station Keypad 1957/00

1 - GENERAL REQUIREMENT

The design, supply, delivery, installation, testing, commissioning and maintenance of the Public Address System shall include, but not limited to the following:

- Recessed mount (ceiling), surface mount, column and / or horn speakers, sound projectors, box and bi-directional box speakers c/w line matching transformers and volume controls, where applicable;

- Termination of all cables to speakers, power amplifiers, etc.;
• Equipment rack complete with forced air ventilation fan(s), mounting brackets blank panels, terminal boards, etc.
• Main equipment and all associated auxiliary equipment;
• Distribution cabling, including fire rated cables, where applicable, cable ladders, racks and Cable supporting systems (cable trunking and concealed metal conduits)
• All other works and materials necessary for the efficient operation of the whole audio system Complete with power supply requirements and surge arrestors and filters.

The primary objective of the system is to provide clear announcements during public addressing and one-way voice communication during an emergency; the secondary function shall be to provide background music where required.

The system shall be capable of fulfilling the following requirements:
• Clear, un-distorted announcements to selected areas during public addressing;
• Clear, un-distorted paging to all zones; either individually or collectively. Selection of groups of zones shall be programmable from time to time; and
• Background music to selected areas when the other functions are not selected.

The loudspeakers shall be wired up in zones and with supervision; localized volume controls as specified shall be provided so that the desired volume adjustments may be made. Locations of localized volume controls are as indicated in the Schedules and /or drawings.

The zones shall further be grouped according to function so that it shall be possible to make an announcement by depressing just one switch on the call station.

To allow flexibility in the system, it shall be designed to be expandable with easy installation without changes in controller.

When the zones are selected for public addressing, a chime shall first be heard, followed by the announcement. The system shall have a range of tones such that it shall be possible to programme different tones for call stations.

It shall be possible for the system to function with different call stations in operation, provided there is no conflict in the zones being called by the call stations. An emergency call station shall be provided for emergency.

The controller shall have a system of priorities such that, should a conflict situation arise, the station or user key with the top priority will override the others. This sequence of priorities shall be determined and programmed during the commissioning stage; it shall be possible to change the sequence by on-site as well as off-site re-programming, as and when the need arises.

The system shall comply with country Public Address Evacuation Code of practice or IEC 60849 for the one-way emergency voice communication system in all aspects.

All control and switching equipment shall be centralized and decentralized as specified and located in equipment racks in the FCC and equipment rooms. No other equipment except the volume controls and
cable patch panel shall be located outside the equipment rack.

All equipment supplied shall be from the same manufacturer. Equipment supplied shall strictly be Standard Products from Public Address Product Manufacturer. No tailor-made product shall be acceptable. The tendered shall submit catalogues of all equipment offered and upon delivery; certificate of country of origin, Certificate of Conformity and Certificate of Evacuation for the proposed PA Equipment shall be submitted.

Zoning for the passenger lifts shall be provided as provision and shall complete with the necessary wiring to be terminated in a termination box near the control panel in each lift motor room. Group zoning for the lifts shall be allowed for evacuation announcement.

**2 - SYSTEM REQUIREMENT**

For general office and public areas, the system shall be capable of delivering a sound pressure level of 85 dB at the listening level.

For M & E areas such as plant rooms, etc where the noise level is higher (assumed to be ≤80 dB), the system shall be able to deliver 95 dB at the listening level.

The reinforced level shall be taken to be 1.5 m above floor level.

The reinforced sound shall be distributed evenly throughout the listening area; the total variation in each area shall not exceed ±4 dB.

An articulation loss of consonants of less than 15% shall be maintained. (Generally, the reverberation time of the various locations shall be assumed to be not more than 1.9 seconds).

Paging announcements shall be possible from any of the microphone call stations, or from the microphone paging station to any zones within the network systems.

Call station shall be using CAT 5 cable with RJ 45 connector to transmit calls.

The microphone paging station shall have the flexibility of selecting any number of user keys (selection buttons) at any one time. It shall be able to program each user key for function.

The central controller shall have a means of monitoring, to continuously monitor the system from the microphone of the call station onwards; any faults shall be displayed on the central unit.

High quality signals shall be maintained at the output of the power amplifiers to compensate for losses in the audio distribution lines.

Each power amplifier with 30% spare capacity shall be provided to drive all loudspeakers during an emergency without overloading.

Each power amplifier shall have a built-in self-restoring protection circuit to guard against hazards of operation such as mis-loading at its input, short-circuiting of its output and connection mistakes.

The power amplifiers shall also have built-in line transformers for 100V loudspeaker matching, DC input of emergency operation. It shall have amplifier monitoring and auto-changeover over circuits & automatic volume control features built-in.

The power amplifiers shall have control inputs and audio inputs for interfacing for fire alarm signals. This control inputs shall be supervised, freely programmable for any system actions and with priorities setting. A built-in amplifier monitoring circuits shall continuously monitor the functioning of the power amplifiers.
and shall automatically switch in a spare power amplifier in case of failure of any of the amplifiers. Upon detection, the status of the fault shall be indicated in the Central or local Monitoring. The number of spare power amplifiers to be provided shall be ten percent of the total quantity of each range of power amplifiers.

All speaker lines shall be supervised for open circuit fault, short circuit fault, and short to ground fault. Upon detection, the status of the fault shall be indicated in the Central Monitoring.

The loudspeakers shall be located such that they meet the necessary requirements. Rooms with on / off volume control units as required are indicated in the schedule of tables. Facilities shall be incorporated to override these volume control units, including those in the “off” position to enable emergency announcements to be broadcast. In general, one ceiling speaker shall be provided for every 25 square meters in each room such as offices and corridors, while a minimum of one ceiling speaker shall be provided for areas less than 25 square meters such as booths, pantry and toilets. Horn speakers shall be provided for all plant rooms, generator rooms and outdoor areas with high ambient noise.

The system shall also have the means to cut-off the music sources during emergency paging and shall enable the emergency announcement to be heard in these areas. All volume controls as specified shall be overridden during emergency announcements.

There shall be background music to selected areas. It shall be possible to pre-program any of the output music to any of these zones. Sources provided shall be a continuous cassette player, MP3, an integrated compact disc player with digital tuner.

All equipment such as the central network controller and power amplifiers shall be housed in 19-inch equipment racks.

3. POWER AMPLIFIERS:

It shall meet the following minimum requirements:

The main function of the power amplifier is the amplification of audio signals for the loudspeakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing output. The power amplifiers are provided with compact 19”, 2U & 3U high housing for tabletop use and rack mounting, while the maximum amplifier wattages varies from 120w to maximums 960w.

The amplifiers are protected against overload and short circuits. A temperature-controlled fan ensures high reliability at high output power and low acoustic noise at lower power output. Additionally, all booster amplifiers have an overheat protection circuit that switches off the power stage if the internal temperature reaches a critical limit due to poor ventilation or overload.

Balanced input and a loop-through connector shall be available for easy connection of multiple booster amplifiers to increase the available output power. The power amplifier shall obtain two balanced inputs with priority control, each with a loop-through facility. This allows for easy and automatic switching between e.g. a local music source and a priority announcement from a remote system.

An additional 100V line input is provided to connect the booster amplifiers to a 100V loudspeaker line, for additional output power e.g. on remote locations. Sensitivity or level control is located on the rear of the unit to avoid accidental setting change. A VU-meter with LED-bar shows the output level.

The amplifiers not only provide 70V and 100V outputs for constant voltage loudspeaker systems, a low impedance output for 8 Ohm loudspeaker loads is available for different usage.

The booster amplifiers operate both on mains power and on a 24V battery power supply for emergency back up, with automatic switchover. Amplifier front panel with LED shall shown as an indicator when it operates on the battery or AC supply.
The power amplifier shall be with the following approval:

- EMC emission acc. to EN 55103-1
- EMC immunity acc. to EN 55103-2

**PERFORMANCE**

- Frequency response 50 Hz – 20 kHz (+1/- 3 dB, @ -10 dB ref. rated output)
- Distortion <1% @ rated output power, 1 kHz

**INPUTS**

- Line input (3-pin XLR, 6.3mm phone jack, balanced)
- Sensitivity 1 V
- Impedance 20 kOhm
- CMRR >25 dB (50 Hz-20 kHz)
- Line input 1, 2 (3-pin XLR, balanced)
- CMRR >25 dB (50 Hz-20 kHz)
- 100V input (Screw, unbalanced)
- Sensitivity 100 V
- Impedance 330 kOhm

**OUTPUTS**

- Line loop through output 1 (3-pin XLR, 6.3mm phone jack, balanced)
- Nominal level 1 V
- Impedance direct connection to line input
- Line loop through output 1,2 (3-pin XLR, balanced)
- Impedance direct connection to line input
- Loudspeaker outputs (Screw, floating)
- Output power @ 24 V
- Battery operation -1 dB ref. rated power

**ENVIRONMENTAL CONDITIONS**

- Operating temperature range -10 to +550C
- Storage temperature range -40 to +700C
- Relative humidity <95%

4. **POWER SUPPLY**

The contractor shall make provision for all necessary power supply units, voltage regulators, etc, to ensure that the equipment will perform satisfactorily c/w necessary surge arrestors and filters.

All necessary power supply (s/s/o’s etc) required for the operation of the sound equipment shall be designed supplied and installed by the contractor.

5. **EMERGENCY OVERRIDE UNIT**

The emergency override unit when activated from the Fire Command Center, it will override all incoming signals to allow emergency messages to pass through.
6 - SYSTEM TESTING

The contractor shall test the system in the presence of the Superintending Officer to show that its performance satisfies the requirement of this specification. All test equipments shall be professional and supplied by the contractor. A sound pressure meter will be required. No claim is allowed for this test. The cost shall be deemed to be included in the schedule of rates for the equipment.

LIST OF APPROVED MAKE

PUBLIC ADDRESS SYSTEM - BOSCH / BOSE / AHUJA