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Gaziray Commuter Train Project

Technical Specification of

Electrical Horn

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	Name	Title	Signature
Approved by	İbrahim ERŞAHİN	Head of R&D Department	
Checked by	Mehmet Şakir ÇELEBİOĞLU	Branch Manager	
Prepared by	Serkan ALPERGÜN	Engineer	
	Oğuzhan HASAR	Engineer	
	Kevser PUSULUK	Engineer	

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II. LIST OF ACRONYMS & ABBREVIATIONS

DeBo	Designated Body
EMU	Electrical Multiple Unit
HV	High Voltage
LRU	Line Replaceable Unit
LV	Low Voltage
NoBo	Notified Body

1 INTRODUCTION

1.1 SUBJECT

This document describes the technical requirements for the procurement of the Electrical Horn to be installed on the Electrical Multiple Units (hereafter called EMU) produced by Turkish Railway Vehicles Industry Inc. (hereafter called TÜRASAŞ).

The bidder shall offer a solution totally compliant with the requirements of this specification.

After signing the contract, possible deviations from this specification or from other specifications and norms mentioned in this document, shall be validated by written agreements between TÜRASAŞ and the Supplier.

This Technical specification and its annexes already prepared in Turkish and English language. The Turkish language shall be prevailing in case of any discrepancy among them.

1.2 DEFINITIONS

Within this Technical System Specification, the following definitions are applied to the words reported below:

- “the End Client” means the Gaziantep Metropolitan Municipality (GAZİRAY)
- “the Administration” means the Turkish Railway Vehicles Industry Co. (hereafter called TÜRASAŞ)
- “the Designer” means BLUE Engineering that is the company responsible for the design EMU set
- “the Supplier” means the company who wins the tender to supply the good object of this specification
- “documentation” means all or any specifications, drawings, reports, networks, operating and maintenance manuals and all other information whether on paper or on magnetic or other format which is prepared by the Supplier in the course of the contract
- “the Bidder” means the company who want to join to the tender to supply the good object of this specification

1.3 DOCUMENTS AND STANDARDS

The EMU shall be designed, assembled and tested according to the following international reference standards:

European Standards: TSI, EN;
International standards: UIC; ISO; IEC;
System of units shall be SI.

Table 1 reports the Applicable Standards for the Scope of Supply.

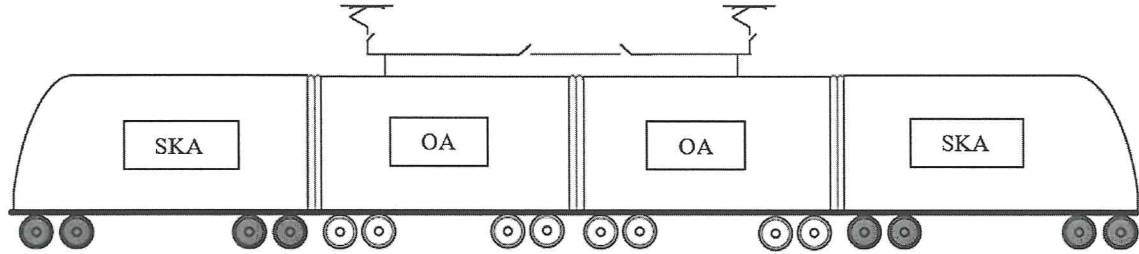
Standard	Year	Title
EN 50121	1,2,3,1,5-2017 3.2,4-2016	Railway applications - Electromagnetic compatibility
EN 50155	2017	Railway applications - Electric equipment used on rolling stock
EN 61373	2010	Railway applications - Rolling stock equipment - Shock and vibration tests
EN 60529	1997	Degrees of protection provided by enclosures (IP Code)

Table 1 – Applicable Standards

1.4 EMU TRAIN-SET CONFIGURATION

EMU is composed by:

- 4 cars: SKA car, OA car, OA car: SKA car



The types of car are hereafter:

SKA = Leading car with driver cab
OA = Intermediate car

The SKA vehicles will be interchangeable and the OA vehicles will be interchangeable.
The EMU will be fixed configuration Unit: the orientation of the different type of vehicles within a Unit is fixed.

The Unit wheel arrangement will be the following: Bo'Bo'+2'2'+2'2'+Bo'Bo'

1.5 EMU TRAIN-SET MULTIPLE CONFIGURATION

The configurations foreseen for the multiple unit operation are the following:

4 cars + 4 cars

4 cars + 4 cars + 4 cars (only rescue mode)

2 SCOPE OF SUPPLY

2.1 HARDWARE

The Supplier shall provide all relevant components related to manufacturing and assembly of the Electrical Horn, but not to be limited to, as following

- All the connectors (mating and fixed parts), accessories belong to connectors, other accessories (with crimp contact)
- Special cables with railway certified, assembly parts (bolt, screw etc), supports and brackets for all equipment belong to system

The quantity of Electrical Horn's equipment shall be given in the following table;

Part Name	Per Each Car		Total For Each Train Set
	SKA	SKA	
Loudhailer	1	1	2 sets
Sound Amplifier	1	1	2 sets
All necessary equipment for Electrical Horn	1	1	2 sets

Table 2 – Equipment Quantity of Electrical Horn

The Bidder shall include in the offer a separate price list for the spare parts listed in the below table.

The Bidder shall accept and guarantee to deliver the pieces /parts in this list to TÜRASAŞ if it is so required by the administration for a period of 10 (ten) years in return of due unit prices that are escalated according to the escalation formula given below:

$$P1 = P_o \times (C1 / C_o) \times (0,10 + 0,35 \times (M1/M_o) + 0,55 \times (L1/L_o))$$

Where:

P1: Escalation unit price (in the currency of Turkish Lira or Euro or USD)

Po: unit price specified in the final lists (in the currency of Turkish Lira or Euro or USD)

Mo, Lo: material (Mo) and labour (lo) indexes applicable in the industry in the country of the Bidder at the date 30 (thirty) days prior to signature date of the contract.

M1,L1: material (M1) and labour (L1) indexes applicable in the industry in the country of the Bidder at the date 30 (thirty) days prior to placement of the purchase order.

If the currency indicated by Po is different than the currency of the country of origin where labour, and material indexes belonged, correction factor shall be used in calculation of escalated

unit prices. Correction factor shall correspond to the foreign currency exchange rate applied by the Central Bank of the Republic of Turkey at the date indexes are applied.

Co: the rate of exchange of foreign currency applied by the Central Bank of Turkey at the date 30 (thirty) days prior to the signing of the contract.

C1: the rate of exchange of foreign currency applied by the Central Bank of Turkey at the date 30 (thirty) days prior to placement of purchase order.

Name of the part	Unit	Qty
Loudhailer	Set	1
Sound Amplifier	Set	1

Table 3 – List of Spare Parts

Supplier shall separately provide the interface connectors of devices and equipment with their mating connectors including all accessories as complete 2 set connectors for contract.
Interface connectors on the devices and equipment can be as board type (pcb type) connectors.

2.2 SOFTWARE

If any, Supplier shall provide diagnostic software tools as 6 sets (programs, special connection cables, etc.) for contract.

2.3 SPECIAL TOOLS AND EQUIPMENT

If necessary to use special tools, Bidder shall include the 2 complete sets of special tools to its offer.

2.4 CONFORMITY TO THE PROJECT REQUIREMENTS

N/A

2.5 EC CERTIFICATION OF CONFORMITY AS INTEROPERABILITY CONSTITUENT

N/A

2.6 SCOPE OF SUPPLY PROJECT MANAGEMENT

N/A

3 TECHNICAL REQUIREMENTS

3.1 INTRODUCTION

All equipment of Electrical Horn shall be compliant with EN50121-3-2, EN 50155 and EN 61373 standards.

The sound level of the Electric Horn on stationary should be within the range of 105 - 118 dB (A) at a height of 1.6 meter at 2 meter distance ahead of the train set.

Frequency range shall be between 500 Hz – 1 kHz.

Electrical Horn shall be activated via button (not in the scope of supply) located on the driver desk.

Sound of the Electrical Horn shall be submitted to TÜRASAŞ for approval in the design phase. It shall be delivered to TÜRASAŞ by uploading the audio file into the equipment.

All equipment shall have at least IP 54 protection level.

Supplier shall give the technical specification, electrical and mechanical installation drawings (2D drawings and 3D models) belong to all equipment to TÜRASAŞ.

3.2 WEIGHT

Supplier shall declare the weight of all the components under scope of supply.

3.3 MANUFACTURING

N/A

3.4 PAINTING

N/A

3.5 INTERFACE SPECIFICATION

3.5.1 Mechanical Interface

Supplier shall define and detail all the mechanical interfaces to the car body of each component included into its system.

3.5.2 Pneumatic Interface

N/A

3.5.3 Electrical Interface

Low Voltage of train set is 110 Vdc (according to EN50155). If product offered by Bidder has different working voltage, Bidder shall declare this in offer. In order to acquire own working voltage from 110V DC, Bidder can use an external DC - DC converter comply with EN50155. Bidder shall submit information of converter to TÜRASAŞ approval. If it is used, DC - DC converter shall be in the scope of supply.

3.5.4 Earthing

For protective provisions relating to electrical hazards on railway vehicles EN 50153 - standard is valid and shall be obeyed.

All equipment causing an electric shock shall be protected against direct contact.
All conductive surfaces of electrical equipment on the vehicle shall be connected to an earthing point for equalization of the electrical potential. This includes conductive surfaces of cubicles, doors and covers.

Exceptions are small items of interior trim in an environment otherwise protected by bonding to car body and/or insulation (e.g. grips, coat hooks, etc.).

All equipment operating at AC-voltage >25V or at DC-voltage >60V shall be earthed for safety. Each earthing point of the equipment shall be designed as follows: the earthing points shall be of good electrical conduction to ensure low touch voltage, the earthing points shall have large contact surface and shall be able to carry a possible short circuit current.

A design according to EN 60529, min IP20 (>12,5mm) is required for cubicles containing Band III voltages.

The min IP20 shall be achieved when there are situations when the cubicle is open and Band III voltage is live.

Each earthing point shall be easily accessible for assembly.

The Supplier shall provide an earthing diagram of its equipment including earthing bonds and shields.

The Supplier shall indicate which cables of his system will be shielded.

Cable shielding may only be used for shielding purposes and NOT as signal, ground or reference wires.

If supplier does not request different connection, cable shields shall be grounded on both ends in order to obtain high shielding efficiency against electric and magnetic fields.

This requires potential equalisation between both grounding points, e.g. through chassis or appropriate structural components.

Grounding of cable shields shall be made with low impedance (large contact surface, preferably over 360 deg. circumference). Grounding by means of sheath wires (pig tails) or connector pins is NOT permitted.

The Low Voltage 0V level in the cars is floating, so shall be avoided an internal connection in the equipment between metallic chassis and the 0V connection; grounding connections in the equipment shall not be connected to car Low Voltage DC power supply.

3.6 SYSTEM AND COMPONENTS LIFE

The required life shall be equal or greater than 10 years.

4 GENERAL REQUIREMENT

4.1 MAINTENANCE MANUAL

N/A

4.2 TRAINING

N/A

4.3 TEST and INSPECTION

4.3.1 INTRODUCTION TO TEST AND INSPECTION

N/A

4.3.2 Supplier Technical Assistance

The Supplier shall provide all the technical assistance necessary for the first installation of the system(s) at TÜRASAŞ.

Installation procedures and check lists shall be provided during this operation in order to be verified and validated. Details will be discussed during evolution of the project.

The Supplier shall attend to installation of equipment on the first train set and commissioning in TÜRASAŞ.

4.3.3 Commissioning

4.3.3.1 Type Commissioning Test

For the first train set, the Supplier shall perform static (factory test on TÜRASAŞ workshop) tests for the system to adequately demonstrate the requirements of Technical Specification, in accordance with a test procedure to be prepared by the Supplier and approved by TÜRASAŞ, under TÜRASAŞ participation.

4.3.3.2 Routine Commissioning Test

N/A

4.4 WARRANTY

4.4.1 Warranty Condition

Supplier shall guarantee the quality of products within the scope of this specification against malfunctions, failures and assembly and workmanship defects.

While the warranty period is limited to 30 months starting with the date of delivery of the products to TÜRASAŞ, it is 24 months starting with the commercial commissioning of the EMU

set. The responsibility of performing preventive maintenance on the normally used parts and the protective maintenance in cases where it is evidently clear that the root cause is not the own malfunctions of the unit, shall belong to TÜRASAŞ.

Throughout the warranty period, following the notification by TÜRASAŞ of any malfunction, the Supplier shall respond to that malfunction within five (5) working days and replace the malfunctioning parts and equipment or repair and fix the malfunction. The Supplier shall make available in Turkey throughout the warranty period the required service facilities in order to respond to the possible malfunctions and a sufficient number of spare parts or fully complete equipment within this time period.

4.4.2 Systematic Fault / Epidemic failure

If a failure covered by guarantee occurs during the guarantee period in more than 25% of the same parts/components, such failure shall be assumed as “epidemic failure”.

In addition, if mean time between failures (general average failure time) for the failures occurring in main components/parts used in all sets within annual periods during the guarantee term is shorter than guaranteed MDBF or MTBF value, such failure shall be deemed as an epidemic failure.

In case of confirmed systematic faults, proper investigations shall be done by Supplier in order to define a proper technical solution or modification including Spare Parts modification or replacement.

4.5 ACCEPTANCE

4.5.1 Temporary Acceptance

Temporary acceptance report shall be issued by TÜRASAŞ after followings have been covered:

- All required components have been delivered.
- All documents have been delivered.
- If required, Routine tests in TÜRASAŞ have been performed successfully

4.5.2 Final Acceptance

Final acceptance report shall be issued by TÜRASAŞ after Track tests of system for first two train sets have been performed successfully.

4.6 PACKAGING, LABELLING AND STORAGE

4.6.1 Packaging

System/equipment/components shall be delivered in suitable packages with adequate strength to be resistant against shocks and transportation damages including effects of dust, rain, snow, solar, wind etc.

Packing boxes shall be convenient for stacking one on another and shall allow easy lifting by fork-lift truck (where reasonably applicable) or travelling bridge-crane.

Following information shall be reported on the package (in a legible, non-erasable and non-removable mean).

- Name, address and registered logo of the manufacturer.
- Assembly Part Number and applicable Tech. Specification reference.
- Date of manufacturing and serial number (if applicable).
- Date and number of the contract.

Furthermore, if the content of a box consists of more than one component, a components list shall be added inside and outside of the box and each individual component shall be labelled. Determination of the content of these boxes shall be performed with the participations of TÜRASAS. Lists of the boxes shall be finalized after approval of the lists by TÜRASAS. A copy of each list shall be sent to TÜRASAS at the beginning of the shipment.

4.6.2 Labels

The system/equipment/components supplied shall be provided with technical markings, in order to fulfil requirements of electrical safety, and provide information to maintenance personnel. Wherever required for health and safety purposes, including where necessary to comply with legislation, parts shall be fitted with suitable safety and warning signs.

In particular the parts supplied, including all replaceable parts, shall be identified by a label showing:

- Serial number;
- Data of manufacturer
- Date of manufacture
- Supplier's part number (if any)
- Revision level;
- Company's part number (if any)

Format and positioning of all labels/markings shall be subject to approval by TÜRASAS. Wherever possible, the position shall be such that any company information (Logo and brand etc.) cannot be viewed when the relevant part is installed within the vehicle.

All labels shall be permanent and indelible.

4.6.3 Storage Conditions

The Supplier shall provide any useful information it is deemed necessary for the correct storage of the goods delivered.

4.6.4 Mounting and Handling

All the components shall be supplied ready for installation and possibly already mounted and pre-regulated. Special care is requested to the Supplier to list all the necessary tools for mounting and maintenance.

4.7 DOCUMENTATION TO BE SUPPLIED TO TÜRASAS

Table 3 shows the documentation which shall be given by the Bidders in the offer phase.

Id.	Stage 1 -OFFER Phase	Time Schedule	Language
1.1	Clause by Clause commentary of present Technical Specification	With offer	Turkish and English
1.2	General description of the proposed system, including all the characteristics and functionalities and technical documentation and information requested in this specification		Turkish and English
1.3	Detailed part list with price information of each part		Turkish
1.4	Spare part price list requested in Chapter 2.1		Turkish
1.5	List of special tools and test equipment		Turkish
1.6	3D models and installation drawings showing the main external space envelope		English

Table 4 – List of Requested Documents in the Offer Phase and Due Date

Notes:

- In the documentation, the Turkish version shall prevail in case of utilisation both Turkish and English languages.
- All documents in stage 1 shall be provided as hardcopy and softcopy in “CD” or “USB flash drive”

END of DOCUMENT