
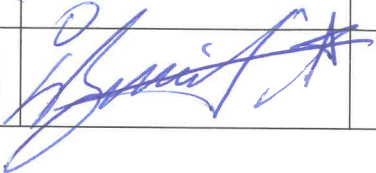



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TECHNICAL SPECIFICATION OF DRIVER'S CAB SEATS

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1. SUBJECT AND SCOPE

This document describes the technical requirements for the procurement of the “**Driver’s cab seats**” to be installed on the Co-Co Type Locomotive (hereafter called LOCO) produced by Turkish Railway Vehicles Industry Inc. (hereafter called ADMINISTRATION) for the DIESEL and ELECTRICAL configurations.

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 ADMINISTRATION and the CONTRACTOR.

The BIDDER shall make clause by clause comment into present technical specification together with their offer.

IMPORTANT NOTE:

The present document shall be examined by the BIDDER, together with the following document:

TŞ400048 – Electric General Technical Specification

TŞ400049 – Diesel General Technical Specification

in order to know general applicable requirements established at LOCO level.

2. DEFINITIONS & REFERENCE DOCUMENTS

2.1. INTRODUCTION

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

- “the Administration” means the Turkish Railway Vehicles Industry Inc. (TÜRASAŞ)
- “the Contractor” 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 digital or other format which is prepared by the CONTRACTOR 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
- “End Client” means the railway company that will be the user of the locomotive.

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2.2. ACRONYMS AND DEFINITIONS

The acronyms and definitions used in this document are reported in the following Table

Acronyms	Description
TÜRASAŞ	Turkish Railway Vehicles Industry Inc.
TSI LOC&PAS	Document 1302/2014/EU and relative amendments of the European Commission (Technical specification for interoperability relating to the rolling stock — locomotives and passenger rolling stock subsystem of the rail system in the European Union)
UIC	International Railway Association
RAMS	Reliability - Availability- Maintainability- Safety
TCMS	Train Control Management System
ERTMS	European Rail Traffic Management System
ADMINISTRATION	TÜRASAŞ
Admin. Personnel	TÜRASAŞ and / or Co-Co project working groups assigned in the relevant subject
Bidder	The company who want to join to the tender to supply the good object of this specification
CONTRACTOR	The winner of the tender and the Contractor of the products covered by this spec.
EN	European Standard
TSE	Turkish Standards Institute
UNI	National Standards Unit
EC	European Community
ISO	International Standard Organization
CAD	Computer Aided Design
LOCO	Diesel/Electrical Mainline Locomotive
NoBo	Established by the relevant commission of the European Union under the directive 2016/ 797 / EC on the ""Interoperability of the rail system within the European Union"" directive. "Notified Body"
TSI SRT	Document 1303/2014 / EU of the European Commission (the technical specification for interoperability relating to 'safety in railway tunnels' of the rail system of the European Union)
TSI CCS	Document 2023/1695/EU of the European (the technical specification for interoperability relating to the control-command and signaling subsystems of the rail system in the European Union)
TSI NOI	Document 1304/2014 / EU of the European Commission (technical specification for interoperability relating to the subsystem rolling stock — noise)

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CSM	Document 402/2013/EU of the European Commission (Common Safety Method for Risk Evaluation and Assessment)
N/A	Not Applicable
TBC	To be confirmed
TBD	To be defined
LRU	Line Replaceable Unit
LCC	Life Cycle Cost
CBM	Condition Base Maintenance
MDBF	Mean Distance Between Failure
MTBF	Mean Time Between Failure

Table 1 – Acronyms and Definition

2.3. REFERENCE DOCUMENTS

In the following table the documents used for reference documents.

Ref	Document	Title
1	TS400048	Electric General Technical Specification
2	TS400049	Diesel General Technical Specification
3	TB50160	Standard List
4	TB50165	RAMS Target Allocation
5	TB50172	Thermoacoustic Behaviour
6	012FX0000005-000	Cab Visibility and Ergonomics

Table 2 – Reference Documents

2.4. SCOPE OF SUPPLY

2.4.1. HARDWARE

The CONTRACTOR shall provide all relevant components related to the manufacturing and assembly of driver's cab seats installed in the LOCO, but not to be limited to, as follows:

- n.4 seats for each Loco (two for each driver's cab): 2 (two) driver's seats and 2 (two) assistant's seats. All seats shall be the same (except for the seat base, see par. 5.2.2) in terms of technical features and appearance and shall be provided fully assembled and tested, ready to be installed and used according to this technical specification.
- Mounting components for mounting the driver's cab seats to the car body.
- Pressure reducer (if needed).

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The scope of supply of the driver's cab seats also includes, but is not limited to, the following:

- 2D with SRP point and H-point clearly marked manufacturing drawings (dwg, pdf) and 3D data
- BOM list;
- Structural calculations;
- Fixing calculations;
- Test reports;
- Assembly instructions;
- Maintenance, cleaning and repair instructions;
- Special tools for maintenance (if any);
- Standards, tests and certification of the materials used;
- Spare parts/fixing elements list;
- All the documentation required at par. 12.

2.4.2. SOFTWARE

N/A

2.4.3. SPECIAL TOOLS

Generally, the usage of special tools shall be avoided to perform preventive and corrective maintenance.

If this is not possible, the CONTRACTOR shall provide a list of tools and 2 complete sets of special tools free of charge.

Nevertheless if they are essential for maintenance (upon CONTRACTOR and ADMINISTRATION agreement), following information shall be supplied in a dedicated section of the Maintenance Manual:

- descriptions and technical data (including SW if present)
- drawings
- use instructions
- list of tasks where the tools usage is mandatory (and of course Maintenance Cards shall refer to the relevant special tools when is needed)
- all the information for purchasing it correctly (technical data, builder, price, and so on) if the special tool is available on the market

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3. STANDARDS TO BE COMPLIED

The LOCO 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.

The complete standards list is indicated in the TB50160.

All the norms have to be with the version indicated in the current TSI LOC&PAS list; if the norm is not listed in the TSI list, has to be applied the version of the norm available at the signature of the contract.

The BIDDER/CONTRACTOR should satisfy the standards indicated in Table 3.

Standard	Title
TSI LOC&PAS 1302/2014	Technical Specification of Interoperability: Rolling Stock - locomotives and passenger rolling stock subsystem of the rail system in the European Union
TSI NOI 1304/2014	Technical Specification of Interoperability: Noise
TSI SRT 1303/2014	Technical Specification of Interoperability: Safety in Railway Tunnels
EN 50126	Railway applications The specification and demonstration of Reliability, Availability, Maintainability and Safety
EN 50125 – 1	Railway applications - Environmental conditions for equipment Part 1: Rolling stock and on-board equipment
EN 45545	Railway applications - Fire protection on railway vehicles
EN 12663-1	Railway applications – Structural requirements of railway vehicle.
EN 50153	Railway applications - Rolling stock - Protective provisions relating to electrical hazards
EN ISO 14040	Environmental management - Life cycle assessment - Principles and framework
EN ISO/IEC 17050- 1	Conformity assessment - Contractor's declaration of conformity
EN 16186-1	Railway applications - Driver's cab - Part 1: Anthropometric data and visibility
UIC 566	Loading of coach bodies and their components.
ISO 10326-2	Mechanical vibration-Laboratory method for evaluating vehicle seat vibration-Part 2: Application to railway vehicles

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EN 50155	Railway applications. Rolling stock. Electronic equipment
ISO 9001	Quality management systems. Requirements

Table 3 – Applicable Standards

The BIDDER shall review and confirm compliancy to the above list of applicable norms, any deviation shall be submitted to ADMINISTRATION for approval.

The BIDDER shall declare if its system/equipment is compliant with other national/international or railroad administration standards not mentioned in the above list.

4. TSI REQUIREMENTS AND RELATED DOCUMENTATION

4.1.1. TSI CERTIFICATION

The LOCO shall be certified according to current version TSI LOC/PAS, TSI NOI, TSI PRM, TSI SRT and TSI CCS by Notified Body (NoBo). LOCO shall be certified by the Designated Body (DeBo) in accordance with national legislation and national rules. The CONTRACTOR shall provide whole calculations, drawings, analysis, test reports and other kind of documentation which is requested by TSIs for the present Scope of Supply. Within the scope of Supply, CONTRACTOR Provide the documentation required for the compliance matrix to be created by NoBo.

The CONTRACTOR/BIDDER shall provide the declaration of conformity of its Scope of Supply to the relevant technical specifications and applicable norms.

The declaration of conformity shall be in accordance to the EN17050 Norm and shall include also the following documents:

- Conformity declaration (The bidder shall submit it at Stage 1, see §12 Table 6)
- Conformity report with all conformity evidence (The CONTRACTOR shall submit it at Stage 3, see § 12 Table 8)
- Type test reports (The CONTRACTOR shall submit them at Stage 3, see § 12 Table 8)

3.1 certificates for the products according to EN 10204 (CONTRACTOR shall submit them in Stage 3, see § 12 Table 12) shall be submitted by the CONTRACTOR to the ADMINISTRATION.

The documentation presented by the CONTRACTOR relevant to the Conformity report with all conformity evidences and test reports will be examined for approval by the NoBo/DeBo in charge of certification of the LOCO.

If there is a need for corrections to the documents or new documents are required depending on the examinations made by the NoBo/DeBo, the relevant documents will be provided by the CONTRACTOR.

The CONTRACTOR is obliged to meet the documents that are not foreseen at the tender stage but are requested by NoBo later on.

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4.1.2. EC CERTIFICATION OF CONFORMITY AS INTEROPERABILITY CONSTITUENT

The driver's cab seat system object of present Technical Specification is an Interoperability Constituent. The BIDDER can join the tender with or without EC Certification of Conformity.

In any case the driver's cab seat system/equipment/component shall be supplied with its own EC certification of conformity according to the applicable and valid TSI regulation by the CONTRACTOR.

The documentation related to the EC Certification of Conformity shall be accessible for examination by the Notified Body in charge of TSI certification of the LOCO nominated by the ADMINISTRATION.

Documentation of EC Conformity shall include at least the following;

- TSI Certificates
- Reports included in TSI Certificates (if any)
- EC Declaration of Conformity
- Document identifying the product to be matched with the certificates (technical drawing, product model number, etc.)

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5. TECHNICAL SPECIFICATIONS

5.1. INTRODUCTION

The main components of the driver's cab seats are listed here below:

- Seat cushion
- Backrest
- Headrest
- Foldable armrests
- Suspension system
- Seat base

In the following figure is shown an example of the complete driver's cab seat assembly.



Figure 1 – Driver's cab seat assembly (example)

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The seats shall be supplied as complete units, fully assembled and tested, ready to be installed on-board as a whole unit by means of simple mechanical fixing operations.

The seat assembly (both driver and assistant) shall be designed and shaped to minimize cavities, ledges and other areas which can trap combustible waste materials (for example waste paper and rubbish) in order that they can be easily removed from the seat itself and the area in or around the seat, in particular beneath the seat during cleaning and maintenance (see EN 45545-4 annex A).

The seat assembly shall be designed to avoid sharp edges in order to avoid injuries to the drivers.

5.2. PRODUCT DEFINITION

The driver's cab seat shall ensure a correct posture and adapt to height differences, providing high comfort according to EN 16186-1.

The design shall follow EN 16186-1 in order to ensuring no negative impact on ergonomics and health.

The driver's cab seat position shall be adjustable to allow the eye position needed for viewing angles.

The driver's cab seat shall be designed and adjustable in order to allow the driver to perform all normal driving functions both in sitting and standing position.

In the following figure is shown the EN 16186-1 annex B.

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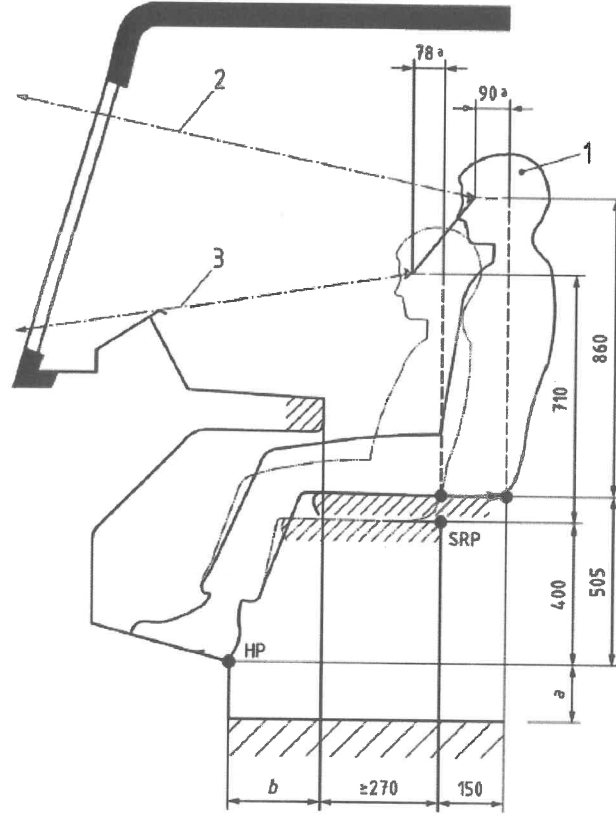


Figure 2 – EN 16186-1 Annex B

5.2.1. SEAT

The driver and assistant driver's seats shall have the same size and appearance.

The CONTRACTOR shall present upholstery samples during the contract and start manufacturing after the decision on colour, pattern and material made by the ADMINISTRATION.

The seat upholstery material shall be resistant to wear and temperature changes, shall not cause sweating, shall not cause cold, and shall be easily cleaned from oil, fuel and other dirt.

The back and sitting parts of the seats shall be covered with a porous material which allow normal body sweating.

The assembled seat and all its parts (upholstery, coating, FRP elements, etc.) shall be flame retardant.

The seat, backrest and headrest sponges shall be made of non-flammable, non-deformable material.

The seat frame and all other seat equipment and parts shall be resistant to working loads, vibration, impact and abrasion.

The driver's cab seat main dimensions are shown in the figure below.

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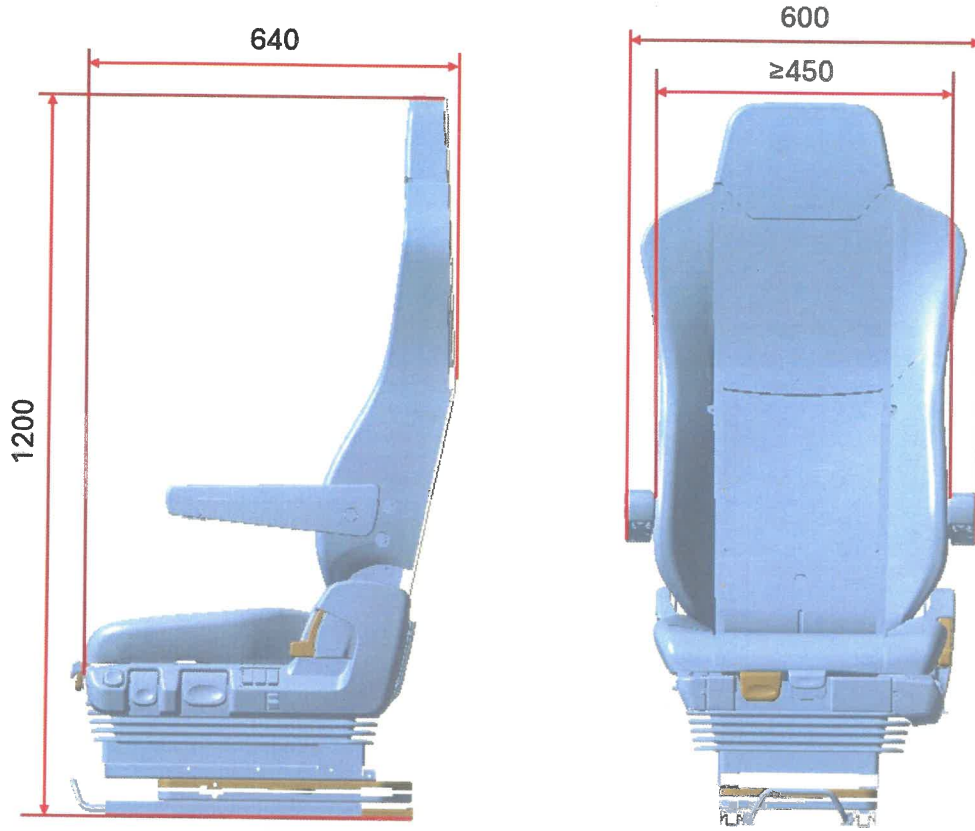


Figure 3 – Driver's cab seat main dimensions (TBC)

To prevent collisions with other components in the driver's cab, the seats shall fit within the following envelope dimensions in their nominal position (not raised, not slid forward):

- Forward-backward direction (x): 640 mm
- Right-left direction (y): 600 mm
- Height (z): 1200 mm

The driver's cab seats shall be equipped with a pneumatic suspension system, for the comfort of the driver, fed by the main compressor.

The air working pressure for the seat shall be 6-8 bar. If needed, a pressure reducer shall be supplied by the CONTRACTOR. (Pressure available at loco side is 10 bar.)

The seat air inlet-outlet hose ends shall be featured with a push-in quick connection on one side and a connector with R 1/8" thread on the other side.

The seats will provide damping that can adapt to the weight of the driver.

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The suspension system will provide a comfortable and ergonomic ride for the driver.

The sitting and backrest cushions of the seats shall be fixed, adjustable, provided with an ergonomic lumbar curvature and separately replaceable.

The driver's cab seat backrest shall be able to be gradually tilted.

The driver's cab seats shall be equipped with an headrest, moveable up and down and 2 foldable armrests moving into a position in line with the backrest cushion and detachable.

The armrests shall be lightly coated and easily retractable. The installation of the armrests on the backrest shall ensure an internal distance between them greater than 450 mm.

The seats adjustments are listed in the table below.

Adjustments	Driver's seat	Assistant's seat
Height adjustment	Yes	Yes
Horizontal adjustment	Yes	Yes
Pivoting (rotation) adjustment	Yes	Yes
Backrest adjustment	Yes	Yes
Armrest adjustment	Yes	Yes
Headrest adjustment	Yes	Yes
Shoulder adjustment	Yes	Yes
Tilt adjustment	Yes	Yes
Seat cushion depth adjustment	Yes	Yes
Adjustable shock absorber	Yes	Yes
Quick release	Yes	Yes
Seat base back and forth adjustment	Yes	No

Table 4 – Seat adjustments

The seat vertical adjustment shall be 100 mm, including the suspension movement.

The horizontal adjustment shall be 170 mm.

A rotating mechanism shall allow the rotation angle of $\pm 120^\circ$. It shall be possible to fix the rotation in the desired working position, but it should not be locked.

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5.2.2. SEAT BASE

There shall be a base under the driver's seat and the assistant's seat that provides their connection to the driver's cab.

The dimensions of the driver and assistant's seats base are shown in the following figure.

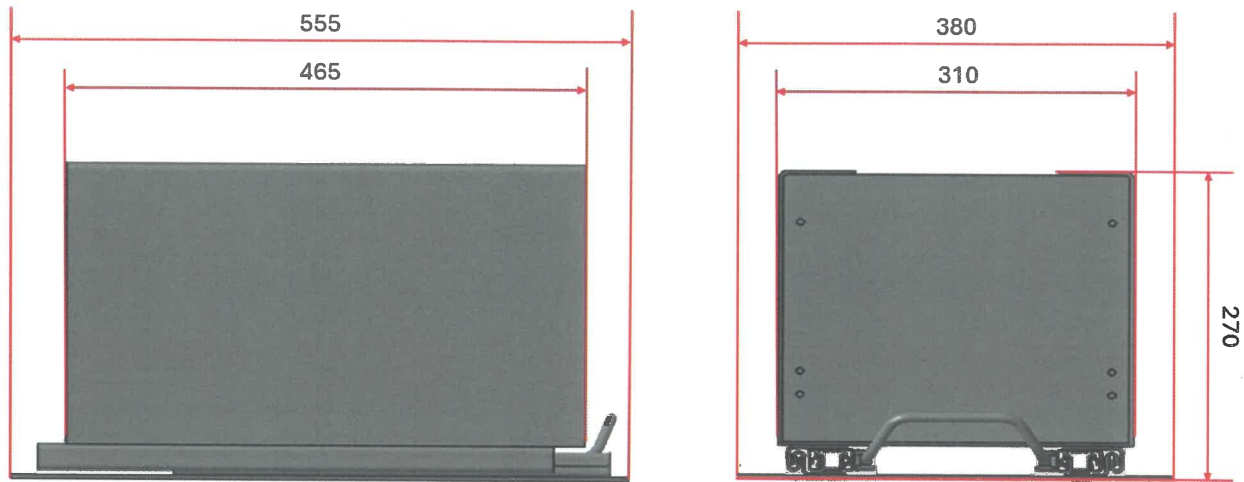


Figure 4 – Driver and assistant's seats base main dimensions (TBC)

The base carrying the driver's seats shall be adjustable 230 mm back and forth (TBC) to allow the driver to drive standing. The base carrying the assistant shall not move back and forth but shall be fixed. Both the driver and assistant's seat bases shall be designed in accordance with the SRP point location (see following figure and Table 2 ref [6]).

Seat bases shall be designed in a manner that hoses passing through them, are not damaged during the seat base back and forth motion and/or the seat back and forth motion.

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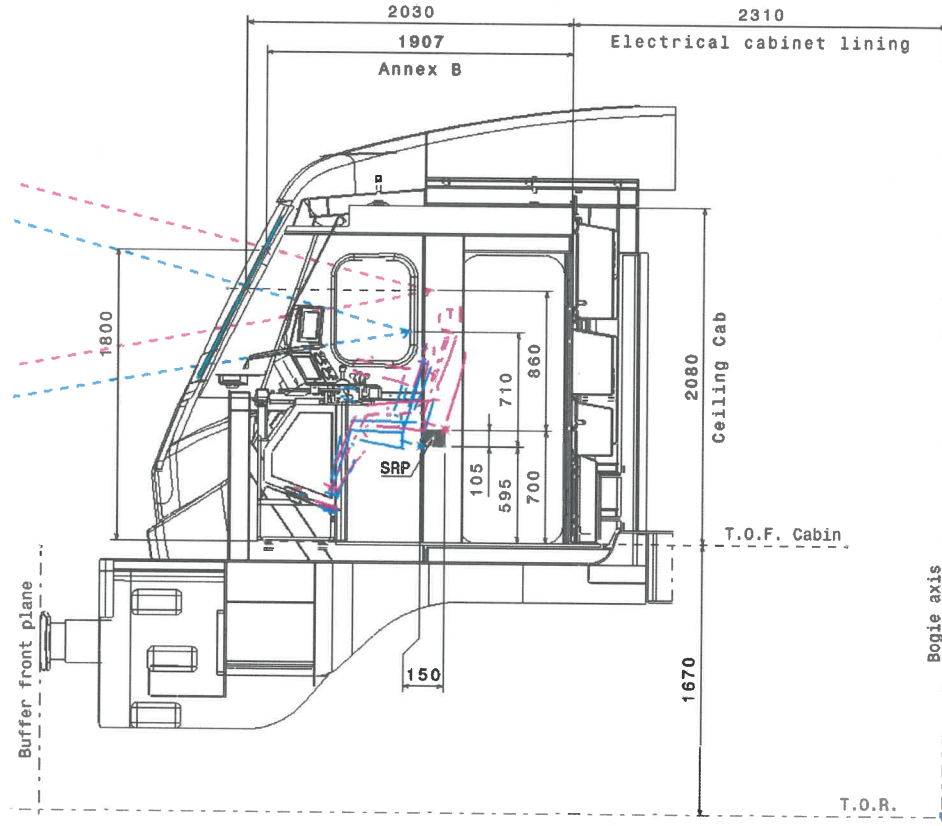


Figure 5 – Driver's visibility and SRP (according to EN 16186-1)

5.3. APPLICATION SOFTWARE

N/A

5.4. DIAGNOSTIC

N/A

5.5. WEIGHT

CONTRACTOR shall be committed to the process of weight management required in order to meet target weights as the Loco design develops.

The target weight of each driver's cab seat assembly (except for fixing base plate, etc.) shall not exceed the maximum weight of 60 kg.

Weight is one of the significant characteristics of the equipment, and it shall be taken into great account by BIDDER/CONTRACTOR.

5.6. MANUFACTURING

N/A

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5.7. INTERFACE SPECIFICATION

5.7.1. MECHANICAL INTERFACE

All connections of the complete (seat + base) driver and assistant's seats, including the connections of the seat to the cab, shall be strong enough to withstand 3g acceleration in the forward and backward direction, 1g acceleration in the lateral direction and 3g acceleration in upward and downward direction. The resistance to such accelerations shall also be provided when the seats are occupied (assuming the personnel weight is 80 kg).

The seat base, of both the driver and assistant's seats, will lean on the floor but shall be fixed, by means of screws and washers (TBD), to the bracket (not in scope of supply) positioned below the floor, which will be fixed to the carbody.

This preliminary fixing system is only a proposal. The measurements of the fasteners for the driver and assistant's seats assembly will be defined together with the supplier during design phase. The supplier shall then verify the structural resistance of the fixing by performing a dedicated calculation. The seat base shall be installed on the cab floor without any resilient mount.

Vibration dampers and shock absorbers shall be included in the vibration damping and shock absorbing systems of the seat assembly.

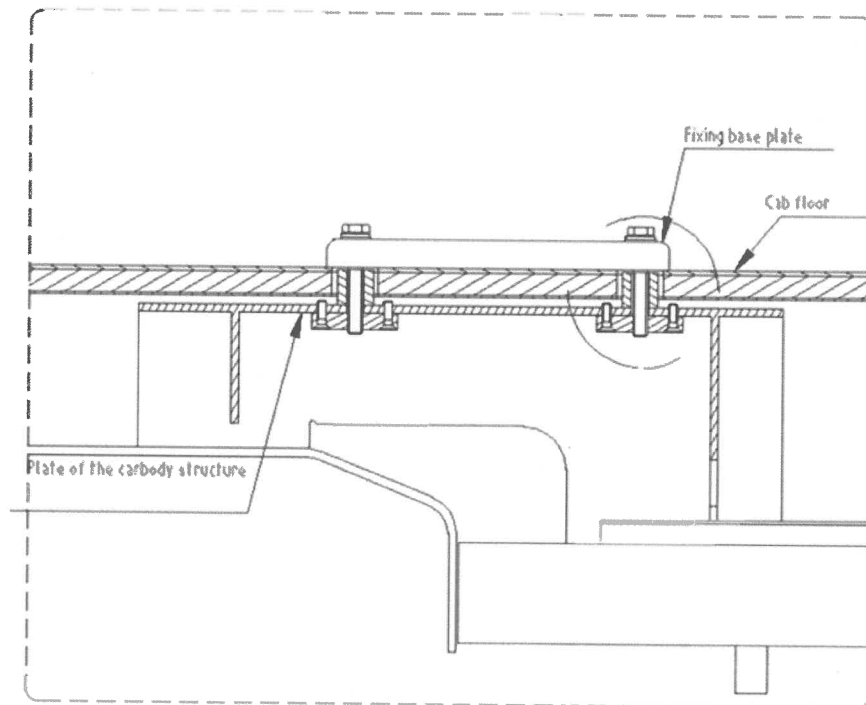


Figure 6 – Fixing of the seat base to the carbody structure (example)

A secondary structure shall be applied below the cab floor and riveted to the car body. The screws shall be inserted in bushes and screwed into threaded plates attached below the bracket.

The threaded plates will act as nuts. The hole in the bush shall be larger than the diameter of the screw. The bushes shall be inserted in larger holes on the cab floor panel in order to tighten the

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screws without damaging the floor. A clearance between the bracket and the lower surface of the floor panel shall be left in order to guarantee the floated mounting of the floor (this connection model is draft.).

5.7.2. ELECTRICAL INTERFACE

N/A

5.7.3. DIGITAL AND/OR ANALOGUE INPUTS/OUTPUTS

N/A

5.8. EARTHING

N/A

5.9. ENVIRONMENTAL CONDITIONS

5.9.1. CLIMATIC CONDITION

The system object of the present document specification shall work properly in the specified climatic conditions (temperature, rain, snow, ice, dust, wind and so on) in particular, ice, sand and snow shall not be cause of malfunction.

General climatic conditions, following the EN 50125-1, are reported in the mentioned General Technical Specification.

5.9.2. NOISE, VIBRATION AND SHOCK

N/A

5.9.1. PROTECTION (IP)

N/A

5.9.2. PAINTING

The BIDDER/CONTRACTOR can propose its own painting specification to ADMINISTRATION. The usage of this painting specification is dependent on ADMINISTRATION approval. Concerning resistance to corrosion, design and processes shall take in account the effect of potential galvanic corrosion.

The colors of products have to be defined by ADMINISTRATION during design meetings.

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5.9.1. ELECTROMAGNETIC COMPATIBILITY (EMC)

N/A

5.10. SYSTEM AND COMPONENTS LIFE

The required life shall be equal or greater than 30 years.

5.11. MATERIAL REQUIREMENT

5.11.1. GENERAL REQUIREMENTS

Materials shall be suitable to allow the normal maintenance activities without need to adopt special protections including welding, cuts and so one. They shall be suitable for the waste disposal without need of particular care.

All information about safety and health shall be provided, even for consumables like glue and cleaning agents.

The choice of materials shall be done to prevent corrosion in every usage condition.

The BIDDER/CONTRACTOR shall give the list of every material used together with their offer.

5.11.2. FIRE RESISTANCE BEHAVIOUR

The supplied system/equipment/components including all their elements shall be compliant to the applicable sections of EN 45545-2.

According to EN 45545-1 and EN 45545-2 standards the locomotive hazard level will be HL2 and operation category will be 2N (freight locomotive). The CONTRACTOR shall submit to the ADMINISTRATION a certificate of conformity to this standard. This hazard level identifies the relevant tests pass-no-pass condition.

The fire performance requirements established for materials are given by means of R(n) index reported by the EN 45545-2 “table 5”. These performances requirements of materials and components depend not only on their intrinsic nature but also on the location, the shape and the layout, the surface exposure, the relative mass and the thickness of considered material. In “table 2” of the EN 45545-2 are listed different products and their location on the locomotive to identify the relevant R(x) requirements.

The BIDDER shall follow the instruction of paragraph 4.2 “General” and paragraph 4.3 “Grouping rules” with the flowchart of Figure 1 “Assessment Process – grouping rules” of EN 45545-2 not only to identify all the material eventually not mentioned hereafter or not mentioned at all in the “table 2”, but also to verify if the requirements are applicable or not (i.e. in case of small quantity, small mass, small exposed areas and so on).

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Concerning the materials used for the scope of supply of present technical specification following requirements have been identified.

Applicable Product type (No)	Definition	Details	Requirement
F2	Seats in staff areas	Staff seat upholstery and supporting structure (including the back/base shell) shall be tested according to the following conditions: - top surface of seat; - back shell from external surface; - external surface of base shell. Test in the end use conditions referring to guidance in Annex A. If the fire integrity condition of 5.2.2.2 is additionally met, then it is not Necessary to test the shell/upholstery composite from the shell face. Whole seat is qualified if the requirement set R19 is met. No further tests required.	R19

Table 5 – Material Fire Behaviours

The BIDDER/CONTRACTOR shall adopt materials with required characteristic and also identify other materials not mentioned above. The above R(x) list is not definitive; the BIDDER/CONTRACTOR shall complete it according to the materials used in the scope of supply.

The CONTRACTOR shall give the list of the inflammable materials used with material type, quantity and fire resistance behaviour tests.

These requirements will be provided for HL2 hazard level.

The documentation presented by the BIDDER or the CONTRACTOR relevant fire performance will be examined for approval by the Notified Body in charge of TSI certification of the National Co-Co Type Mainline Locomotive Project nominated by the ADMINISTRATION. The CONTRACTOR shall be responsible to perform all necessary activities which are required by Notified Body.

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5.11.3. SMOKE OPACITY AND TOXICITY

All the materials used do not emit toxic gases in such quantities as to be harmful. The parameters taken as reference for the selection of materials, and the requirements they must meet, are described in "Table 5" of the EN 45545-2 standard with reference to the classification of the hazard level of the LOCO and the set of requirements R(n) to which the material is associated.

5.12. LABELS/MARKING

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.

There must be traceable label/markings on the seats that match the 3.1 Certificates (on the component in legible position and form).

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

- Serial number;
- Data of manufacturer
- Date of manufacture
- CONTRACTOR'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 ADMINISTRATION. 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.

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6. RELIABILITY, AVAILABILITY, MAINTAINABILITY AND SAFETY (RAMS) REQUIREMENTS

6.1. RELIABILITY, AVAILABILITY, MAINTENABILITY & SAFETY (RAMS)

The CONTRACTOR shall make RAMS analysis according to TB50165.

7. TRAINING AND MANUAL

7.1. TRAINING

N/A

7.2. MAINTENANCE MANUAL

7.2.1. MAIN FEATURES OF THE MANUAL

The CONTRACTOR shall prepare integrated manual for the operation and maintenance of its scope of supply equipment.

The manuals shall contain:

- supplied system/equipment description;
- preventive maintenance tasks description;
- corrective maintenance tasks description (repair instructions included)
- information in order to carry out the overhaul of the system/equipment and the heavy repair
- (if it is repairable and off Loco).

The manual will be used as the basis for LOCO operation and maintenance by End Client staff. The manual shall be prepared in electronic editable format and the language UK English and Turkish.

7.2.2. CONTENTS OF THE MANUAL

The manual shall contain as minimum the following information/instructions:

- Description and Operation
 - General description and operation of system/equipment
 - Functional description and operation of all LRU's and components
 - Mechanical and electrical data sheets for all LRU's and components.
- Maintenance Activities
 - Preventive Maintenance Plan including the maintenance periodicity (frequency) table for system/equipment.
 - Reported information shall be the same of those described by the Preventive Maintenance analysis and be linked with detailed Maintenance Instructions.

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- Preventive Maintenance Plan shall report reference to specific/special tools needed for the maintenance works (if used).
- Maintenance Instructions shall report step by step detailed description of each task of the maintenance plan in order to include all information necessary for carrying out the relevant work.
- The Preventive Maintenance Plan shall include all activities foreseen for the system/equipment from daily inspection up to major repair/overhaul.
- Preventive Maintenance card/instruction
Each maintenance instruction shall include:
 - task periodicity
 - safety warnings
 - cleaning materials
 - recommended lubricants
 - torque values
 - special tools (if any): as special tool is intended either a tool (hardware and/or software) that is exclusively produced by the CONTRACTOR and is essential for system/equipment maintenance, either a tool available on market but expensive, sophisticated, with long lead time and so on
 - step by step activity description with necessary schemes, drawings and illustrations, including:
 - scheduled activities (greasing, topping up, visual check, etc)
 - removal and refitting
 - off- LOCO overhaul
 - final functional check

The CONTRACTOR is responsible to update the maintenance instructions until the end of the general warranty period of the last supplied equipment.

- Corrective Maintenance card/instruction
Each maintenance instruction shall include:
 - trouble shooting
 - safety warnings
 - torque values
 - special tools (if any)
 - step by step activity description with necessary schemes, drawings and illustrations, including:
 - removal and refitting
 - off- LOCO repair
 - failure diagnosis
 - final functional check

The CONTRACTOR is responsible to update the maintenance instructions until the end of the general warranty period of the last supplied equipment.

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7.2.3. FORMAT OF THE MANUAL

The format of the Maintenance Manual can vary according to the ADMINISTRATION and the End Client requirements, therefore here following are reported some rules generally applicable.

Specific requests shall be communicated when available.

- The Manual shall report/contain the same references, drawings, schemes, component codes, Part Numbers, definitions, descriptions, terminology and so on used in the system/equipment configuration and design documentation to guarantee a perfect correspondence and to avoid mismatching during tasks performance.
- In the manual, the parts should be shown by numbering on the exploded picture. Within the scope of this picture, there should be a list consisting of Part No, Stock or Part Code No, Part Name and Quantities
- The manual shall highlight the importance for a correct identification of LRUs/components by utilizing the same identification name reported by the technical drawings.
- The manual shall be transmitted by electronic means (CD copy) and in the final version a paper copy is also requested for each release.
- The documentation in electronic format shall be in a completely editable form (Office Word version TBD)
- The PDF format can be used as formal delivery of the documentation (in order to be used as official delivery towards End Client)
- Pictures and photos shall be inserted and not simply linked.
- Photos should be only JPEG format.
- Pictures should be only TIFF format.

Derogations from above listed issues can be discussed and agreed between ADMINISTRATION and the CONTRACTOR pending the respect of End Client requirements

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8. TESTING, INSPECTION AND ACCEPTANCE

LOCO shall be certified following the TSI LOC&PAS regulation. If the component shall satisfy the TSI, the CONTRACTOR shall be responsible for all relative certification of the equipment presented to NoBo.

8.1. INTRODUCTION TO TEST AND INSPECTION

The CONTRACTOR shall perform the tests and the inspection in accordance with the Approved Test Procedure and the Approved Inspection Specification.

ADMINISTRATION and/or end Client have the right to witness any of these tests and inspections at any stage of test and inspection procedure.

Type test can be waived if system or components are already proven and confirmed to waive by End Client. In that case, the CONTRACTOR shall provide old test report or certificate to submit for approval.

All test and inspection specifications and reports including all repair activities and check-lists shall be submitted by CONTRACTOR and approved by ADMINISTRATION.

8.2. TYPE TESTS

Type tests are required to verify that the components of the system object of the scope of supply, operate in accordance with the Approved Design Data.

The CONTRACTOR shall perform type test for the equipment according to TSI LOC&PAS and related standards.

The CONTRACTOR shall perform Type Tests, in accordance with a test procedure approved by ADMINISTRATION with ADMINISTRATION and/or End Client participation.

During testing, the criteria shall be observed and recorded. All alterations, adjustments and maintenance works required by ADMINISTRATION shall be carried out by the CONTRACTOR.

The CONTRACTOR has the responsibility for the success of mentioned Type Tests.

8.3. ROUTINE TESTS

Routine tests are required to verify that the components of the system object of the scope of supply have been built in such a way that it satisfies the requirements of the Approved Design Data as verified by the Type Test.

The CONTRACTOR shall perform routine tests in accordance with a test procedure approved by ADMINISTRATION under his responsibility, and, if necessary, with ADMINISTRATION participation.

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During tests, the criteria shall be observed and recorded and necessary alterations, adjustments and maintenance works shall be carried out.

Records from Routine tests shall be kept by the CONTRACTOR and made available timely for ADMINISTRATION and/or end Client's inspection.

All copies of the approved routine test results shall be submitted. Additional copies of records of all tests/inspections results shall also be kept at the CONTRACTOR's work to be made available to ADMINISTRATION or their representative on demand.

This test shall include functional test, visual inspection and dimensional inspection, as a minimum. The test details shall be approved.

8.4. PROTOTYPE

Within the scope of product supply, the CONTRACTOR shall manufacture a prototype(s) in accordance with the technical specifications and annexes. The contractor will continue manufacturing after getting approval from the ADMINISTRATION for the prototype. Acceptance of the prototype does not imply acceptance of all products. Products that have previously received prototype approval are not subject to the prototype requirement.

8.5. SUPPLIER TECHNICAL ASSISTANCE

The CONTRACTOR shall provide all the technical assistance necessary for the first installation of the system(s) at TÜRASAŞ, if requested by the ADMINISTRATION.

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.

If requested by the ADMINISTRATION, The CONTRACTOR shall attend to installation of equipment on the first LOCO, to commissioning in TÜRASAŞ and also to track test on Turkish Railway Network.

8.6. COMMISSIONING

N/A

9. AUTHORIZATION TO START PRODUCTION

The ADMINISTRATION will authorize the CONTRACTOR to start production according to the following stages.

If the contractor has previously supplied products to ADMINISTRATION within the scope of this technical specification, the content of this title will not be applied.

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9.1. DESIGN FREEZING

After the contract is signed, procurement scope Design Freeze meetings will be held with the participation of ADMINISTRATION and the CONTRACTOR. The date and place of the meetings will be mutually agreed.

9.2. AUTHORIZATION TO START PRODUCTION

According to the final design criteria mutually agreed upon as a result of the design freeze meetings, the ADMINISTRATION will authorize the CONTRACTOR to manufacture the first product(s) within the scope of supply.

9.3. AUTHORIZATION TO START MASS PRODUCTION

The CONTRACTOR will begin mass production after receiving approval from the ADMINISTRATION for the prototype product manufactured.

10. ACCEPTANCE

Acceptance report shall be issued by ADMINISTRATION after followings have been covered by the CONTRACTOR:

- All required components have been delivered.
- All documents have been delivered.
- Routine tests and/or controls (physical inspections, dimension and tolerance control, appearance control, document/report and certificate controls etc.) to be carried out at TURASAS have been successfully completed.

The following physical examinations will be made by ADMINISTRATION. According to the results obtained from these examinations, the whole lot will be accepted, and if any of the results are not found suitable, the whole party will be rejected.

10.1. DOCUMENT CONTROL

Documents to be controlled:

- Documents stated in the relevant section (Table 8)

10.2. PHYSICAL CONTROLS

The following examinations will be made on the samples to be selected according to the "Sampling" article of the specification.

10.2.1. FUNCTION CONTROL

Determining whether the functions described in this technical specification have been performed as intended and whether any problems have occurred during the installation process will be determined by the installation of a sufficient number of seats on the LOCO, subjecting it to a function check by

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the ADMINISTRATION, and obtaining approval from the relevant factory for acceptance. Based on the results of the checks, the ADMINISTRATION reserves the right to reject the entire lot.

10.2.2. DIMENSION AND TOLERANCE CONTROL

Seats will be subjected to measurement and tolerance control. In this technical specification only general dimensions and/or preliminary dimensions are given. During the contract period, all dimensions will be finalized and frozen with the approval of ADMINISTRATION.

Drawings showing the final dimensions (the drawings delivered to the CONTRACTOR by the ADMINISTRATION and the drawings delivered by the CONTRACTOR and approved by ADMINISTRATION) will be delivered with each party of the product. Dimension control will be done according to these drawings.

10.2.3. VISUAL INSPECTION

In the visual inspection, it will be examined that the products are new and the marking is suitable. Defects similar to damage, deformation, corrosion, etc. and residues, gaps, cracks, caused by manufacturing errors etc. shall not be observed, and no action will be taken to correct defects.

10.2.4. WEIGHT CONTROL

Weight of the seats will be controlled according to Article 5.5 of this technical specification. Based on the results of the control, the ADMINISTRATION reserves the right to reject the entire lot.

10.3. SAMPLING

For the inspection of parts; The number of samples to be controlled is determined according to TS ISO 2859-1 and TS ISO 28590 and General Inspection Level (Level II), taking into account the delivered lot size.

11. PACKAGING AND STORAGE CONDITIONS

11.1. 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. in the climatic conditions.

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.

Even in the scenario that the products cannot be assembled to the locomotive in a short period of time and are kept unused in the warehouses for a long period of time (3 years, etc.), the products shall be packaged and delivered in a suitable way so as not to be damaged in any way.

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.

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- 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 ADMINISTRATION. Generally ADMINISTRATION anticipates packs are divided for one locomotive production. Also packs should be divided for different production lines, i.e. mechanical and electrical. Lists of the boxes shall be finalized after approval of the lists by ADMINISTRATION. A copy of each list shall be sent to ADMINISTRATION at the beginning of the shipment.

The CONTRACTOR shall deliver the equipment that has been supplied for receipt with the manufacturing completed covered in suitable plastic so as not to be affected by environmental factors such as rain, wind and snow and so as not to be damaged during dispatch and stocking; and tied to wood crates from the outside to prevent dispersing. The CONTRACTOR shall deliver the products prepared in this form to the TÜRASAŞ Eskişehir Regional Directorate at their own cost.

There will be pallets under the crates so that the load can be discharged with a forklift. The weight of the crates with material will not exceed 400-500 kg. On the crates, the name of the contractor, the name of the material, the order, classification, (technical specification number) and drawing number, the number of parts in the crate, the serial numbers of the parts, the date of manufacture, the contract number, the packaged product quantity, product name, batch number, if any, etc. (not to be affected by climatic conditions) will be specified. The list containing this information will be delivered on the basis of the crate, together with the delivery note and invoice.

The materials shall be placed inside the crates wrapped in a suitable thickness of plastic bubble wrap that will not allow the material to be affected by climate and environment conditions like rain, wind and snow a or to be damaged during loading, dispatching and stocking.

If the packaging and/or the delivery documents of the products are not complete and/or not suitable this will be entered on record and the products will be returned to the CONTRACTOR without completing the delivery process. If the returned materials are resubmitted after the delivery date specified in the contract the late fine specified in the contract shall accrue. The CONTRACTOR shall not claim any rights for delays due to the packaging.

The contract number, the amount of product in the packaging, the product name and party number if any, etc. as well as the "Project Name: National Co-Co Type Locomotive" shall be on the packaging.

11.2. STORAGE CONDITIONS

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

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In addition, the necessary conditions and procedures to be applied in order to prevent damage to the products stored in warehouses without being used for a long time will be delivered by the CONTRACTOR in detail.

11.3. 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 CONTRACTOR to list all the necessary tools for mounting and maintenance.

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12. DOCUMENTS TO BE DELIVERED TO THE ADMINISTRATION ALONG WITH THE PRODUCT/EQUIPMENT

The following tables report the list of requested documents (with schedule) to be supplied to ADMINISTRATION.

Table 6 shows the documentation which shall be given by the Bidders in the offer phase.

Table 7 and Table 8 show the documentation which shall be provided by the CONTRACTOR for the Preliminary Technical Review and the Detail Technical Review respectively.

Id.	Stage 1 -OFFER Phase	Time Schedule	Language
1.1	Clause by Clause commentary of present Tech. 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 as preliminary (Including a detailed technical drawing showing the SRP point and H-Point of the seat. The adjustment possibilities and tolerances of the seat should be shown in the technical drawings)		Turkish and English
1.3	Preliminary 3D models or installation drawings showing the main external space envelope		English
1.4	Preliminary definition of main I/F characteristics with the other LOCO systems		Turkish and English
1.5	Declaration of Conformity to applicable standards According to EN17050		English
1.6	EC Declaration of Conformity according to the TSI LOC&PAS 1302 or a letter of commitment stating that EC conformity for the "Interoperability Constituent" to be delivered at Stage 3		English
1.7	IRIS Certification of the Bidder (If the Bidder is an agency of the manufacturer, the Bidder shall show the manufacturer's certificate). or ISO 9001 Quality Management System Certificate Bidder (If the Bidder is an agency of the manufacturer, the Bidder shall show the manufacturer's certificate).		English
1.8	Documents showing that they are the manufacturer/authorized distributor of the relevant equipment and that they provide service/spare parts supply support within the country		Turkish and English
1.9	10-year spare parts supply guarantee commitment (valid from the end of the warranty period)		Turkish and English

Table 6 – Stage 1 Offer Phase: list of requested documents and due date

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Id.	Stage 2 - PRELIMINARY Review	Time Schedule	Language
2.1	First level drawings with weight and centre of gravity indications in 3D and 2D formats	Within one month after signing the contract	English
2.2	Technical description of the system, with system characteristics and performance		English
2.3	Functional description (normal and degraded mode) of the system, included diagnostic description		English
2.4	Definition and specification of applicable I/F's characteristic (mechanical, pneumatics, electrical, signals, I/O data, etc.)		English
2.5	Preliminary applicable analysis reports (performance, consumptions, structural strength, bolt connection calculation etc.)		English

Table 7 – Stage 2 list of requested documents and due date

Id.	Stage 3 - DETAIL Review	Time Schedule	Language
3.1	Definitive drawings with weight and centre of gravity indications in 3D and 2D format. (Including the SRP point and H-Point of the seat)	With the delivery of the product/equipment	English
3.2	Installation drawings		English
3.3	Installation instruction		Turkish and English
3.4	Detailed description of the supplied components or systems		Turkish and English
3.5	All the technical documentation and information requested during the project (including final version of documents of previous stages)		Turkish and English
3.6	Procedures of tests (Routine, type, commissioning and homologation) performed on components and systems		Turkish and English
3.7	Available reports of tests (routine, type, commissioning and homologation) performed on components and systems		English
3.8	List of special tools and test equipment		Turkish and English
3.9	LRU list		Turkish and English
3.10	Spare Parts and Equipment List (including order codes)		Turkish and English
3.11	Final documentation for Certification (including all certificates and documents showing compliance with the standards / norms specified in the technical specification)		Turkish and English
3.12	EC Certification according to TSI LOC&PAS 1302/2014 (the scope of Supply is considered "Interoperability Constituent" see chapter 4.1.2 for more details) <ul style="list-style-type: none"> • EC declaration of Conformity (valid, published on ERADIS) • TSI Certificates for applicable modules (valid, published on ERADIS) • Definition of the IC (showing TSI certificates and EC DoC reference, e.g. drawing with the same drawing number mentioned in the certificates) 		English

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Id.	Stage 3 - DETAIL Review	Time Schedule	Language
3.13	RAMS and LCC documentation: see dedicated paragraphs		Turkish and English
3.14	User Manuals		Turkish and English
3.15	Maintenance Manuals (including periodic maintenance Schedule) (including failure repair documentation)		Turkish and English
3.16	Calculations, tests and analysis reports requested by TSI		Turkish and English
3.17	3.1 certificates of the product/equipment according to EN 10204 (with traceable serial numbers)		English
3.18	Documents showing compliance to EN 45545-2 (Certificate of Conformity, Test Report etc.) (see chapter 5.11.2)		Turkish and English
3.19	Guarantee documentation		Turkish and English
3.20	Reports showing the strength of all bolted connections		Turkish and English

Table 8 – Stage 3 list of requested documents and due date

The BIDDER/CONTRACTOR shall review and confirm the above lists of documents for all the phases of the project. Any deviation shall be submitted to ADMINISTRATION for approval.

The IRIS and/or ISO 9001 certificate submitted by the BIDDER in Stage 1 will be examined by the ADMINISTRATION for compliance with the scope of the product/work subject to tender.

The documents specified in Stage 3 shall be submitted to the ADMINISTRATION together with the delivery of the product/equipment. The ADMINISTRATION may also request the documents in Stage 3 along with the prototype product. Particularly documents that are subjected to NoBo evaluation (e.g. TSI certificates) and documents that have an effect on design (e.g. definitive drawings) might be needed before delivery.

The documents to be delivered by the CONTRACTOR in Stage 3 shall be provided to the ADMINISTRATION in 2 (two) USB devices and in hard copy.

Notes:

- 3D models of all components shall be provided, shall be in “.step” format and shall be complete with all elements, connectors included.
- 2D drawings shall be provided in .dwg or dxf format (plus PDF).
- All documents related to FEA calculation, test reports and certifications shall be provided in .pdf format.
- Other documents shall be provided in an editable format and in .pdf format.
- 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”

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13. INTELLECTUAL AND INDUSTRIAL PROPERTY ISSUES

13.1. Any projects and documents shared with the CONTRACTOR within the scope of the work subject to the tender shall not be used for any other purpose. The CONTRACTOR shall share all technical information only with the ADMINISTRATION

13.2. ADMINISTRATION shall be authorized to use the products and documents to be supplied by the CONTRACTOR (right of usage) – without prejudice to any mandatory legal provisions applicable and without any detriment to the CONTRACTOR’s dignity and reputation.

13.3. In case of proven violation of an intellectual and / or industrial property rights by the CONTRACTOR, the CONTRACTOR shall be liable for any direct, reasonable and properly documented damages resulting directly from such violation. If the ADMINISTRATION faces legal sanctions, it is allowed to recourse such sanctions to the CONTRACTOR within the scope of liability of the CONTRACTOR mentioned above. Upon the request of the ADMINISTRATION, the CONTRACTOR is obliged to fully inform and certify to the ADMINISTRATION whether the service to be undertaken is a matter of intellectual and industrial property.

13.4. This technical specification is a part of the contract between the CONTRACTOR and the ADMINISTRATION. The CONTRACTOR does not have the authority to distribute this document or any part of it to third parties without the approval of the ADMINISTRATION.

13.5. If an official document is requested and mutual communication causes any mistake; all possible information requests and their responses shall be made in written format and via e-mail

14. GUARANTEE

14.1. WARRANTY CONDITION

CONTRACTOR 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 ADMINISTRATION, it is 24 months starting with the commercial commissioning of the LOCO.

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 ADMINISTRATION.

Throughout the warranty period, following the notification by ADMINISTRATION of any malfunction, the CONTRACTOR shall respond to that malfunction within three (3) working days and replace the malfunctioning parts and equipment or repair and fix the malfunction. The CONTRACTOR 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.

Responsibility for making sure that none of the information, document, certificate, component, system, machine, software, technology and design the CONTRACTOR supplies to the

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ADMINISTRATION violates any brand, patent or third-party ownership rights belongs to the CONTRACTOR.

The contractor company shall provide a 10 (ten) year service and spare parts guarantee, valid from the end of the warranty period.

14.2. SYSTEMATIC FAULT / EPIDEMIC FAILURE

During the warranty period, if a failure covered by the warranty occurs in more than 15% of the first 24 locomotives and more than 10% of the 25th and the following locomotives in the same parts/components for the same reason, this failure will be considered an “epidemic failure.”

In addition, if mean time between failures (general average failure time) for the failures occurring in main components/parts used in all locomotives 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 in order to define a proper technical solution or modification including Spare Parts modification or replacement.

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15. OTHER ISSUES

- 15.1. For matters not specified in the technical specification, the administrative specification shall apply.
- 15.2. The CONTRACTOR is responsible for all transportation costs.
- 15.3. The CONTRACTOR is responsible for work accidents that may occur during the work of the CONTRACTOR personnel at TÜRASAŞ.
- 15.4. The food and accommodation costs of the CONTRACTOR personnel belong to the CONTRACTOR.
- 15.5. The CONTRACTOR must comply with T.B. 2348 in its work within the boundaries of TÜRASAŞ.
- 15.6. The CONTRACTOR must comply with the safety, protective safety, occupational health and safety instructions and provide the protective materials required by the work and follow their use.
- 15.7. The contractor must comply with all kinds of warnings, signs and writings within the boundaries of TÜRASAŞ.
- 15.8. All software used by the contractor (Computer Aided Design Programs (CATIA, AutoCAD etc.), MS Office. FEM Analysis Programs etc.) will be licensed. All responsibility in this regard belongs to the CONTRACTOR.
- 15.9. The CONTRACTOR is responsible for all kinds of damages and losses to ADMINISTRATION or third parties in relation to the obligations fulfilled within the scope of the work subject to the tender.

16. ANNEXES AND NOTES