

TŞ 250.900

NATIONAL Co-Co TYPE MAINLINE LOCOMOTIVE DEVELOPMENT TECHNICAL SPECIFICATION

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Rev.	Date	Description	Revised by
00	05.10.2023	First release	
A	27.10.2023	In accordance with the official letter of the Production Planning and Control Department dated 26.10.2023 and numbered E-30116632-000-163249 and the official letter dated 26.10.2023 and numbered E-30116632-163378, the welded manufacturing jigs & fixtures design has been removed from the technical specification.	Rasim ÖZTÜRK

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1. SUBJECT

This Technical Specification includes matters regarding general and technical specifications, the responsibilities of the contractor, project phases, project management, warranty, documentation, etc. in respect of the National Co-Co Type Mainline Locomotive Project which will be manufactured by the TÜRASAS Eskişehir Regional Directorate with axle load being maximum 22.5 tonnes and operation speed being 120 km/h.

2. SCOPE

Within the scope of this technical specifications, works shall be performed for a vehicle with Co-Co bogie arrangement with the three different drive systems specified below. The minimum characteristics and the general requirements of the National Co-Co Type Mainline Locomotive, which are planned to be designed and manufactured under the following conditions to have TSI Certificate, are given in Annex-1. The designs and all the documents for the work forming the subject matter of bidding shall be developed according to this technical specifications and its annexes. In this scope, after preliminary design a locomotive to be selected according to the final customer request shall be manufactured. For the remaining two types of locomotives all the works shall be developed to the level including preliminary design.

- 1. Dual Mode Locomotive:** The design will be developed up to the level including preliminary design in accordance with TSI certification. The Contractor shall be responsible for the preparation of the documentation, which is the design output and the basis for certification, in the process up to the relevant design phase.
- 2. Electric Locomotive:** The design will be developed up to the level including preliminary design in accordance with TSI certification. The Contractor shall be responsible for the preparation of the documentation, which is the design output and the basis for certification, in the process up to the relevant design phase.
- 3. Diesel Electric Locomotive:** The design will be developed up to the level including preliminary design in accordance with TSI certification. The Contractor shall be responsible for the preparation of the documentation, which is the design output and the basis for certification, in the process up to the relevant design phase.

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EC verification shall be carried out for TSI certification according to SB+SD modules for the vehicle type to be determined after preliminary design will be manufactured by TÜRASAS Eskişehir Regional Directorate. The EC verification process according to the SB module shall be under the responsibility of the Contractor. During the EC verification process according to the SD module, the Contractor shall provide support to the Administration throughout the entire process.

2.1. The works for the locomotive to be determined after preliminary design shall be conducted in a way that manufacturing will be carried out in compliance with TSI certification by the Administration. All documents for the locomotive to be produced (analyses and detailed designs that are under the responsibility of the Contractor, documents ready for manufacturing, etc.) and all documents which are design and analysis output for the remaining two types of locomotives until the end of the preliminary design phase shall be prepared by the Contractor.

2.2. All the three (3) locomotive types shall have Co-Co bogie configuration.

2.3. All the three (3) locomotive types shall be similar to each other to the maximum extent possible. (Except for some mandatory differences specific to locomotive power mode)

2.4. It shall be ensured that all the three (3) locomotive types have common equipment and subsystem to the maximum extent possible. (Except for the equipments/systems specific to the relevant power mode (pantograph, diesel engine, alternator, etc.))

2.5. The suitability/availability of the components used in the E5000 National Electric Mainline Locomotive with the Bo-Bo bogie configuration in the National CoCo Type Mainline Locomotive project shall be evaluated by the Contractor and a report shall be submitted to the Administration on this subject.

2.6. All the processes and other matters described under this specification apply to each vehicle type separately.

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3. DEFINITIONS

Table 1 - Definitions

TÜRASAS	Türkiye Raylı Sistem Araçları San. A.Ş.
Administration	TÜRASAS
Administration's Personnel	TÜRASAS work groups appointed to the relevant task
Work	Works for the development of a National Co-Co Type Mainline Locomotive with 3 different power mode (dual, electric, diesel-electric)
TSI LOC&PAS	European Commission document 1302/2014/EU (technical specification for interoperability relating to the locomotives and passenger rolling stock subsystem of the Trans-European railway system)
TSI SRT	European Commission document 1303/2014/EU (technical specification for interoperability relating to safety in railway tunnels of the Trans-European Conventional and High Speed railway system)
TSI CCS	European Commission document 2016/919/EU (technical specification for interoperability relating to the control-command and signalling subsystems of the Trans-European railway system)
TSI NOI	European Commission document 1304/2014/EU (technical specification for interoperability relating to the rolling stock - noise)
SB	Type examination module
SD	EC verification based on quality management system of the production process
CSM	European Commission document 402/2013/EU (Common Safety Method for Risk Assessment)
NoBo	Notified Body authorised by the related Commission of the European Union in the scope of Directive 2016/797/EU on the interoperability of the rail system within the Community. It stands for Notified Body .
AsBo	An independent body appointed to assess the conformity of the safety risk process executed with CSM regulations. It stands for Assessment Body .
UHDGM	General Directorate of Regulation of Transport Services
Dual Mode Locomotive	A dual mode locomotive is a type of locomotive that can be powered either from an electricity supply (like an electric locomotive) and/or by using the on-board diesel engine (like a diesel-electric locomotive).
Industrial Design	Necessary activities/ design works for external appearance and vehicle interior use, considering the criteria such as compliance with the requirements of the user
Concept Design	Design in which vehicle layout, general dimensions of vehicle, preliminary weight analyses, equipment installation interfaces and the requirements of standard are included.
Preliminary Design	Design in which equipment and industrial design are included following the approval of the concept design.

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Detailed Design	Design in which mechanical and electrical detailed designs (3D models) are completed following the approval of the preliminary design and which complies with all the applicable standards (UIC, TSI, EN Norms, etc.).
Final Design	Process/design phase in which data (2D installation and component drawings, etc.) about the locomotives ready for manufacturing is created.
Bidder	Company/companies that submit a bid for the tender
Contractor	As a result of the tender to be made, the company that has signed a contract for the works within the scope of this technical specification
Document forming the basis of manufacturing	<p>All necessary 2D drawings including the necessary detailed measurements/dimensions, tolerances (position-surface tolerances), welding symbols, welding bends, undercutting, bending axis, etc data for the Administration to be able to manufacture the components at the Administration's facilities and/or under the market conditions.</p> <p>For the ready-made products to be purchased, the documents describing the technical characteristics of the products (not over a link, but in Word format) (these documents will also include the serial codes/brand/model information, if any, in a line)</p>
Functional Design of Locomotive	Determination and description of all the functions of locomotive. How each one of the requirements for the locomotive will be met, which subsystems/systems will be used to provide this function, the determination of the technical characteristics of the relevant subsystem and making subsystems compatible with each other are included in the scope of the functional design.
TCMS Functions	In addition to those locomotive functions that will be performed via TCMS, functions that will realise as a result of the relationship between locomotive sub-units and other locomotive components with TCMS. Description in a systematic way of all the train subsystems, train components and TCMS sub-units which TCMS will control, from which TCMS will receive diagnostic data and with which TCMS will communicate is included in the scope of TCMS functions. The requirements for the development of TCMS such as TCMS hardware architecture, communication architecture, hardware and software backup, data logging, onboard installation, connection to passenger coaches, remote access to train, safety-critical level, etc. are included in the scope of TCMS functions. Those locomotive and train controls provided by locomotive electrical installation or controllers other than TCMS, are described separately than TCMS functions.
TCMS Scenarios	Description of the conditions changing in and out of TCMS, possible operation and fault scenarios for the performance of TCMS functions. TCMS scenarios provide all the necessary locomotive information as well as the information about the operation of locomotive so as to be able to prepared TCMS algorithms.

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CbC	Clause-by-Clause evaluation with suppliers to ensure that the technical specifications of the equipment and/or systems to be procured meet the project requirements.
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4. STANDARDS

The directives, standards and requirements listed below in the order of priority shall be abided by in all the works to be performed by the Contractor under the technical specifications and for the conditions required to be met by the National Co-Co Type Mainline Locomotive, equipment and sub-components addressed in this technical specifications.

Where it is impracticable to comply with these directives, standards and requirements, if the detailed assessment submitted by the Contractor is considered appropriate by the Administration, the conditions mandated by the other relevant international standards, the standards from the European countries, national standards and TCDD regulations and the national legislation may be used.

- Directive 2016/797/EC concerning the Interoperability of the Trans-European Railway System
- TSI LOC&PAS
- TSI SRT
- TSI CCS (with respect to Conformity Control)
- TSI NOI
- CSM
- Technical documents and annexes thereto published for the relevant TSI directives
- EN STANDARDS
- UIC STANDARDS
- IEC, ISO, other international norms and standards (DIN, NF F, UNI, CEI, etc.)
- National standards (TS, etc.)

If a standard of a higher priority contains omissions regarding the particular matter, such omissions shall be removed by the next standard.

In case of a revision in the standards/norms referred to herein while the work is in progress, the Contractor shall:

- Inform in writing the Administration within 20 (twenty) business days after the revision has been published and put into force.

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- Make the necessary processes for adaptation to the new situation no later than 1 (one) calendar month after the revision has been published and put into force and submit them to the Administration for approval.
- The Administration shall review the process within 30 (thirty) business days and forward their decision to the Contractor.
- The change of directives, standards, norms will not prevent the completion of the certification.

The Contractor shall review this technical specifications and its annexes and if, in this technical specifications and its annexes, there are:

- Conflicts with or violations of international standards;
- Problems to arise in case of implementation;
- Points that need to be revised technically;
- Matters that are not mentioned in the technical specifications and its annexes, but are necessary/mandatory for the manufacturing of the vehicle,

the Contractor is obligated to report these (together with the Contractor's proposals) in writing to the Administration.

5. RESPONSIBILITIES

5.1. Design Responsibilities

5.1.1. The works described herein shall be performed for all vehicle types including Electric, Diesel Electric and Dual Mode. All the works shall be completed according to the main characteristics of locomotive, TSI conditions, weight-kinematic-dynamic gauge conditions of vehicle and the norms and standards applicable to the selected type of vehicle.

5.1.2. The Contractor shall carry out works as part of the content of this specification and its annexes in the scope of the work forming the subject matter of bidding. During the execution of these works, review meetings concerning administrative matters shall be held at the facilities of the Administration or at the facilities of the Contractor if deemed necessary by the Administration once a month as a face-to-face meeting. Design review meetings to be held by the technical teams shall be held every 2 weeks by video conference (at shorter intervals and with the exception of face-to-face meetings if deemed necessary by the Administration).

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5.1.3. The Contractor shall submit all the results they obtain during the works performed by them under this heading as well as the intermediate period outputs to the Administration at periodical intervals on time and work package basis.

5.1.4. The Contractor shall determine the main equipment/components to be used for the locomotives and the materials for manufacturing in accordance with the main characteristics of locomotive given in Annex 1, with at least 3 (three) alternatives, and submit them to the Administration for approval.

5.1.5. The Contractor shall perform all the works falling in the scope of the work forming the subject matter of bidding in accordance with the technical specifications, the relevant annexes thereto and the standards referred to in STANDARDS in the technical specification.

5.1.6. The main characteristics of locomotive delivered to the Contractor are the minimum technical characteristics, and the Contractor shall make such possible modifications and additional requests as may arise during the work flow without demanding any additional payment.

5.1.7. The Contractor is responsible for the design development, design, revision, preparation of the necessary documentation and project management for all three vehicle types, from the concept design stage to the completion of the preliminary design for Electric, Dual Mode and Diesel Electric locomotive types, and from the concept design stage to the completion of the locomotive certification for the locomotive type to be determined after preliminary design.

5.1.8. The contractor shall develop the technical specifications/characteristics of the components and systems in accordance with the relevant standards and will prepare the purchasing technical specifications in Turkish and English. Contractor shall revise the technical specifications as requested if deemed necessary after control by the Administration. In the event that the components used in the E5000 National Electric Mainline Locomotive are fully/partially used in the National CoCo Type Mainline Locomotive project, the Administration will share the technical specifications of these components as they are present in the inventory with the additional technical specifications if there is any with the Contractor.

5.1.9. The demonstration for each subsystem of the suitability of the certificates and documents required to be obtained for the satisfaction by the main and subsystem equipment of locomotive (TCMS, Traction Motor, C/I Unit, Main Transformer, Auxiliary Power Supplies, Diesel Engine-Alternator Set, Emission components, Cooling Systems, Brake Systems, etc.) and the systems associated with this equipment of the requirements of all the norms and, in particular, TSI LOC & PAS, referred to in the technical

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specifications as well as the suitability of such systems/equipment and the design of locomotive in a way not to hinder the installation, manufacturing and maintainability of these systems on-board the locomotive shall be carried out by the Contractor.

5.1.10. The Contractor shall ensure the preparation of all necessary projects and technical documents in the process starting from the concept design and three-alternative industrial design for the Locomotive type to be determined after preliminary design to the completion of the locomotive TSI certification and submit them to the Administration. (Documents ready for manufacturing such as BOM trees, the preparation of manufacturing drawings, installation drawings and assembly plans, sheet metal cutting and bending drawings, etc.) (The documentation based on the design and production of the components to be purchased is not considered within this scope.). The Contractor shall ensure the preparation of all 3D data and design phase output documentation for Electric, Dual Mode and Diesel Electric locomotives, starting from the concept design and three-alternative industrial designs, to the completion of the preliminary design and shall deliver the final frozen data, all iterations of which have been completed, to the Administration.

5.1.11. The Contractor shall provide Technical Support (The details of this are explained in article “Technical Support” of this specification) in such scope as will be determined by the Administration.

5.1.12. The Contractor shall prepare the functional design of locomotive, electrical installation design, cabling design, cabling cutting and installation documents, system integration plan, electrical installation testing and commissioning plans, TCMS functions, TCMS scenarios and the outputs that complement all these designs, projects and documents in shape and format specified by the Administration.

5.1.13. Cable connections to all equipment such as driver's desk, electrical panels, electrical boxes shall be in a connector structure. Terminal type connections will not be accepted in these connections.

5.1.14. Grounding projects and carbody grounding projects for each system shall be prepared in shape and format specified by the Administration. The Contractor shall submit the grounding cables section calculation documents to the Administration.

5.1.15. The Contractor shall identify the technical characteristics / requirements of the components (purchased components-commercial parts) to be supplied from third parties, primarily the critical equipment and prepare their purchasing technical specifications (Turkish and English) and submit them to the Administration, along with the possible supplier proposals including at least three alternatives. (In

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this respect, the Contractor will consider using local suppliers.) The Contractor shall, in their proposals including alternatives, give priority to the known suppliers collaborated in the previous projects of the Administration and/or well-known and proven companies referenced in national/international projects. In the event that the components used in the E5000 National Electric Mainline Locomotive are fully/partially used in the National CoCo Type Mainline Locomotive project, the Administration will share the purchasing technical specifications of these components with the Contractor.

5.1.16. The Contractor shall define the Condition Based Maintenance (CBM) system approach to be applied to the National CoCo Type Mainline Locomotive. Subjects regarding CBM shall be included separately in the technical specifications to be prepared by the Contractor. This approach shall interface with all subsystems and manage the definition of the relevant CBM algorithms, indexes and additional sensors.

5.2. Responsibilities in the scope of Analyses

5.2.1. The Contractor shall make all the necessary analyses such as static, dynamic, collision, vibration, noise, flow, etc. in accordance with the TSI requirements and EN norms.

5.2.2. Also, all the calculations that are not given under this section, but may be requested by the NoBo, are at the Contractor's responsibility. The Contractor shall meet such requests free of charge.

5.2.3. The Contractor shall carry out all the activities relating to the execution of the analyses (the determination of load conditions, the determination of analysis method, the interpretation of analysis results, etc.) and be responsible for the accuracy of the relevant outputs and having the entire process approved by the NoBo.

5.2.4. The Contractor shall carry out design verification activities until the design is finalised.

5.2.5. The Contractor shall prepare a 3D model of the final design and all the manufacturing data (part and assembly manufacturing drawings, sheet metal bending / laser cutting drawings (in dxf format), installation plans (documents showing the assembly sequence of components), etc.) following the final verification of the results of all the improvement activities, analysis and simulations carried out.

5.2.6. The Contractor is obligated to identify and provide the inputs (sensor map, load inputs to be applied, test scenarios to be carried out, etc.) that will be required for the strength tests to be performed.

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5.2.7. The Contractor shall assess the compliance of the static and kinematic gauge analyses, etc. of vehicle gauge with the TSI requirements.

5.3. Responsibilities in the Certification Process

5.3.1. The Contractor shall provide NoBo consultancy service to the Administration during the TSI certification process carried out by the NoBo appointed / to be appointed by the Administration as part of the consultancy for TSI certification. In this process:

5.3.1.1. The Contractor is responsible for the preparation of all the documentation to be provided to NoBo that will allow completing the TSI certification process successfully (the completion of the Compliance Matrix delivered by the NoBo, the preparation of the documents under the Technical File to be prepared by the NoBo in the format requested by the NoBo in a way that they will be directly submitted to the NoBo, etc.). All documentation to be prepared by the Contractor within the scope of the obligations defined in this specification will be in the format requested by NoBo. The Administration shall not make any additions to the documents to be received from the Contractor. Therefore, the documents to be prepared by the Contractor shall be complete. All documentation provided by the Suppliers will be forwarded to the Contractor and compliance shall be checked by the Contractor. All documentation to be submitted by the Administration regarding manufacturing, etc. shall be checked for conformity by the Contractor.

5.3.1.2. The documents considered incomplete or insufficient by the NoBo shall be updated by the Contractor free of charge. This process shall continue until the approval of the NoBo. The Contractor is responsible for the modifications in the documentation or the documentation format, etc., which will be requested by the NoBo.

5.3.1.3. The TSI certification process will end with;

- Obtaining the TSI certification by the NoBo
- Obtaining type approval certificates at UHDGM
- Obtaining all relevant documents in terms of registration, ECM and safety, etc. of the locomotive or the main components in the locomotive, according to the legislation published and in force by the UHDGM,
- Following the submission of the relevant documents to the Administration and the publication of the TSI certificate, the project will be finalized with the approval of the Administration

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In this process; The Contractor shall submit all documents of TSI certification and Type Approval certification to the Administration within the scope of its responsibilities defined in this specification.

5.3.1.4. The Contractor shall review the design outputs in accordance with the TSI directives during the design phase and report the results in a way that they are directly transmitted to the NoBo in the format requested by the NoBo.

5.3.1.5. The Contractor is responsible for the compliance of the documents of the sub-components to be supplied / manufactured by the Administration with the TSI requirements. The Contractor shall check the conformity of the documentation/certificates provided by the suppliers regarding the purchased components. The Contractor shall check the TSI compliance of the documents to be delivered by the Administration and if there are any non-conformances, inform the Administration in respect thereof, together with the proposals for solution.

5.3.1.6. The Administration will deliver the compliance matrix to be sent by NoBo to the Contractor. The Contractor shall review the compliance matrix received from the NoBo and prepare a Guide Document for the Administration within 45 (forty five) days. The Guide Document shall serve as a detailed road map indicating all the activities in the scope of the certification process. Guide Document shall clearly specify which activities (test procedure, demonstration, commissioning, certifications from suppliers, etc.) will meet/close the items included in the TSI Compliance Matrix. The activities indicated in the Guide Document shall fully be detailed in the Certification Process Management Plan to be prepared by the Contractor. The Administration will examine the relevant document in regards to adequacy and the Contractor shall revise the prepared document according to the Administration requests if needed.

5.3.1.7. The Contractor shall prepare the Certification Process Management Plan (Turkish and English). This plan shall be prepared based on the TSI Compliance Matrix provided by NoBo. This document shall clearly show how each TSI requirement will be met (through drawings, analyses, tests, technical description documents, etc.). Also, the Contractor shall plan in this document when the provided verification evidence will fully be prepared by which department. When preparing the plan, the NoBo's assessment schedule and the Administration's requests shall be considered. The Administration may review the Certification Process Management Plan and request it to be detailed. In this case, the Contractor shall meet the Administration's requests in this regard without demanding any additional payment.

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5.3.1.8. The Contractor shall prepare test specifications in accordance with TSI and all other relevant standards specified in this technical specification. The tests mentioned here are all necessary tests at the locomotive level to be performed within the scope of the project (locomotive integration, static and dynamic, homologation, etc.). The Contractor is responsible for the approval of the aforesaid test specifications by the NoBo.

5.3.1.9. In the test specifications prepared by the Contractor, in addition to the references to the relevant standards, documents (specification, analysis report, etc.) and technical drawings, the reference of which the said test specification meets/closes in the TSI compliance matrix shall also be clearly written.

5.3.1.10. Responsible personnel of the Contractor shall also participate in the meetings with the subject of testing held by the Administration with NoBo. In these meetings, Contractor personnel shall take all necessary actions for the progression of the project by taking active role in subjects regarding design.

5.3.1.11. The Contractor is obligated to inform the Administration of the documents the Contractor will forward to the NoBo. No exchange of document shall take place between the Contractor and the NoBo without the knowledge and approval of the Administration. All the communication, online meetings, etc. between the NoBo and the Contractor shall be conducted in English and to the knowledge of the Administration.

5.3.1.12. The Contractor shall provide all the documentation required to be prepared as part of the SAFETY and RAM activities (PHA, HAZOP, Hazard Log, other documents in Safety Case, Fire Safety Concept, Fire Safety Inventory List, Failure Mode and Effect Criticality Analysis, LCC Analysis, etc.). The activities to be carried out as part of Safety and RAM shall be indicated in the Guide Document mentioned above. The activities to be carried out and the documents to be prepared shall be detailed in the Certification Process Management Plan. (The customer will inform the RAMS targets on the basis of locomotive and equipment, and the contractor will base these values in RAMS calculations. If the reference RAMS value is not given by the customer, the values calculated by the contractor and already available values referenced/used by suppliers will be taken as basis.)

5.3.1.13. The Contractor is responsible for the compliance of the Safety and RAMS documents of the sub-components to be supplied / manufactured by the Administration with the TSI and Project requirements. The Contractor shall check the compliance of the documents to be delivered by the

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Administration with TSI and Project requirements and if there are any non-conformances, inform the Administration in respect thereof, together with the proposals for solution. The Contractor shall, in this scope, review the documents forwarded by the suppliers. The Administration shall review the purchasing technical specifications which are prepared by the Contractor and notify the Contractor of any deficiencies determined or revisions. The Contractor shall make such revisions free of charge.

5.3.1.14. The Contractor shall provide consultancy service for Common Safety Method - Risk Assessment (CSM-RA) as part of the Safety Management System and prepare all the documentation required to be submitted to the AsBo and submit them to the Administration.

5.4. Quality Plan

The Contractor shall develop a "design quality plan" for the locomotives forming the subject matter of the contract. The Quality Management System of the Administration will be applied for the production processes.

6. DESIGN PROCESSES

In general, processes include, but not limited to, the following:

6.1. The Contractor shall identify the main equipment/components that will be used for the locomotives and vary depending on the type of locomotive and the other materials for manufacturing and submit them to the Administration in terms of manufacturability, availability and provision.

6.2. Industrial Design: The Contractor shall prepare the exterior images with 3 alternatives for each vehicle type (electric, diesel-electric and dual mode) which is unique and in accordance with the locomotive main characteristics and international standards and submit them to the Administration. On the industrial design selected by the Administration, the Administration's further change requests shall be made free of charge and the final design will be delivered.

6.2.1. The Contractor shall present the Administration with three (3) separate interior and exterior visual designs specific to the locomotives to be designed within two weeks following the signing of the contract. In the case of presented design found to be inadequate, another 3 more different designs shall be delivered within 2 weeks following the design change/additional design request.

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6.2.2. The industrial design models to be prepared by the Contractor shall be used for all the three vehicle types and the industrial design of vehicles shall be the same as much as possible, apart from minor differences showing the drive type of vehicle (for example, it will show that the diesel electric locomotive has a generator set, the electrical locomotive has a pantograph, etc.).

6.2.3. Control desk shall be worked as the interior and exterior trimming. Control desks may show minor differences specific to the type of locomotive. Symbols showing the type of vehicle shall be used on the desks.

6.3. Concept Design: The Contractor shall submit to the Administration a concept design containing vehicle layout, the general dimensions of vehicle, preliminary weight analyses, and equipment installation interfaces and standard requirements and complying with all the standards referred to above (UIC, TSI, EN Norms, etc.). If the Administration requests revisions to be made in the concept design submitted by the Contractor, if this request is in the concept design phase (T1), the Contractor shall make such revisions without demanding any additional payment. If there is a revision request by the Administration after the concept design is frozen, this request will be decided upon mutually between the Contractor and the Administration. (Except in cases where the administration subsequently detects non-compliance with the required standards and customer requirements)

Details of all types of vehicles to be designed and manufactured (equipment, materials, components to be used; vehicle power, vehicle dimensions, interior and exterior trim equipment, equipment placements, etc.) will be defined at this stage.

6.4. Preliminary Design: The Contractor shall submit to the Administration a preliminary design containing the equipment and the industrial design and complying with all the standards referred to above (UIC, TSI, EN Norms, etc.) following the approval of the concept design mutually. If the Administration requests revisions to be made in the preliminary design submitted by the Contractor, if this request is in the preliminary design phase (T2), the Contractor shall make such revisions without demanding any additional payment. If there is a revision request by the Administration after the preliminary design is frozen, this request will be decided upon mutually between the Contractor and the Administration. (Except in cases where the administration subsequently detects non-compliance with the required standards and customer requirements)

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6.5. Detailed Design: The Contractor shall submit to the Administration a detailed design in which the mechanical and electrical detailed designs are completed and which complies with all the standards referred to above (UIC, TSI, EN Norms, etc.) following the approval of the preliminary design mutually. At this stage, on-board cabling, piping and all the necessary brackets shall also be included. If the Administration requests revisions to be made in the detailed design submitted by the Contractor, if this request is in the detailed design phase (T3), the Contractor shall make such revisions without demanding any additional payment. If there is a revision request by the Administration after the detailed design is frozen, this request will be decided upon mutually between the Contractor and the Administration. (Except in cases where the administration subsequently detects non-compliance with the required standards and customer requirements)

6.6. Final Design: It is the process where the data about the locomotive ready for manufacturing is developed. If the Administration requests revisions to be made in the final design submitted by the Contractor, if this request is in the final design phase (T4), the Contractor shall make such revisions without demanding any additional payment. If there is a revision request by the Administration after the final design is approved, this request will be mutually agreed between the Contractor and the Administration. (Except in cases where the administration subsequently detects non-compliance with the required standards, the technical specification and customer requirements)

6.7. Supply Activities: The Contractor shall submit to the Administration the requirements for all the equipment, systems and components and, in particular, the critical components to be used for the locomotive. The Contractor shall submit a reasoned report containing at least 3 alternatives to the Administration for the companies to which the said equipment will be supplied. (In this respect, the Contractor will consider choosing local suppliers.) The Contractor shall, in their proposals including alternatives, give priority to the known suppliers collaborated in the previous projects of the Administration and/or having commonly used products. The Administration shall supply equipment in accordance with these requirements and according to the proposals with alternatives. In case no supplier can be found, the Contractor shall revise the requirements and/or propose new suppliers. The Contractor shall prepared the technical specifications, assessing them in terms of compliance with standards and functionality. The technical specifications to be drawn up by the Contractor shall be referred to in the

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project plan, which will also be submitted by the Contractor, together with the deadlines therefor. The Contractor shall perform the CbC works with the suppliers under the Administration's control.

In the event that the components used in the E5000 National Electric Mainline Locomotive are fully/partially used in the National CoCo Type Mainline Locomotive project, the Administration will share the technical specifications of these components with the Contractor.

6.8. Manufacturing Activities: The Contractor shall correct the non-conformances encountered during the manufacturing and the revise all the documentation requiring to be revised free of charge. Even if the locomotive design is frozen, the Contractor is responsible for the necessary revisions on the technical drawings and all other documentation as a result of the measures to eliminate the nonconformities arising from the design encountered during production, test and certification and the design changes to be made within the scope of manufacturability and ease of assembly.

6.9. Testing Activities: The Contractor shall prepare the necessary test procedures for TSI certification and TS EN IEC 61133, along with the Routine and Type tests to be applied at the locomotive level (locomotive integration, static and dynamic, homologation, etc.) for locomotive type to be determined after preliminary design, and shall plan these tests in accordance with the project timetable. For the type of vehicle planned to be produced, it is the Contractor's responsibility to ensure that the NoBo processes are carried out smoothly, to obtain the relevant approvals and to prepare the necessary specifications, in addition to these works.

6.10. Documentation: The documentation explained in detail in article "Documentation" of this specification shall be delivered to the Administration by the Contractor.

6.10.1. The design documents to be submitted for all work packages defined within the scope of the tender shall be prepared in accordance with their transfer to the TÜRASAS PLM system. The details about the PLM system shall be forwarded to the Contractor prior to the preparation of the 3D data and 2D technical drawings of the vehicle. (The guide document related to the PLM system will be shared with the Contractor by the Administration.)

6.11. Certification: Until TSI certification is obtained for the locomotive planned to be manufactured, the responsibilities defined within the scope of this specification (design and documentation revision, requirements arising from tests, etc.) will be fulfilled free of charge by the Contractor. In other words, it is the Contractor's responsibility that the design to be made and the documents to be prepared comply

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with TSI. In case of a conflict between TSI and the Project requirements, the Contractor shall be responsible for the revisions to be made in the design, analysis and documentation and make such revisions free of charge.

6.12. Project Review Meetings

6.12.1. A face-to-face Kick-off Meeting will be held at the facilities of the Administration within 10 (ten) days following the signing of the contract with the Contractor. This meeting shall correspond to T0 period indicated in article 6.14.

6.12.2. Also, project review meetings shall be held between the Contractor and the Administration's personnel during the project development process. The meetings to be held during the project may be held at the Administration's facilities and/or in such place as will be considered appropriate by the Administration, provided that it is related with the National Co-Co Type Mainline Locomotive. If considered appropriate by the Administration, the meetings may also be held remotely (online).

6.12.3. The parties that will attend the meetings shall be decided according to the content of the subject matter. The Contractor is responsible for arranging the attendance of their Project Manager/ Person in charge of Certification and Risk Management (or personnel authorized to make decisions on behalf of the Contractor) in the meetings. The review meetings shall be held at least 1 (one) time in every 15 (fifteen) days. If the Administration requests the review meetings to be repeated more frequently and/or an extra meeting to be made apart from the routine ones, the Contractor shall attend the meetings, as specified by the Administration. If the Administration requests an extra meeting apart from the routine review meetings (This request can also be made via e-mail), the Contractor shall meet the request of the Administration within 5 (five) days.

6.12.4. Minutes of meeting shall be prepared at the end of the meeting and signed mutually.

6.13. Interactive Work Principles

6.13.1. All kinds of exchange of information (video conference, the development of a cloud platform, FTP Server working platform, etc.) between the Administrator and the Contractor during the project are treated as an interactive work. The Contractor shall define the platform(s) over which exchange of information

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will take place. The Contractor shall grant such number of the Administration's personnel as is requested by the Administration access to the aforesaid platform.

6.13.2. Following the contract signature, the work method will be determined according to the work packages for effective information sharing and interactive work between the Contractor and the Administration. (The Contractor will prepare the communication matrix according to the work packages and submit it to the approval of the Administration.)

6.13.3. The Contractor shall keep their employee(s) who will maintain the communication with the Administration's personnel as part of the interactive work posted to the project during the project.

6.14. Project Work Packages

The sub-work packages of the project and the descriptions of them are given in Table 2. The Project Beginning date shall be considered to be the date when the contract is signed with the Contractor. A kick-off meeting shall be held within 10 (ten) business days from the signing of the contract with the Contractor and shall be T0 period.

Bidders shall submit detailed price breakdown for the work packages in their bid.

Table 2 – Work Packages

Duration	Project Phase	Description of Phase
T0	Kick-off Meeting	<p>The Administration shall organise a kick-off meeting to launch project processes. The purpose of the kick-off meeting is to introduce the project plan, explain the overall project execution, present the communication matrix and detail program for all project activities under the contract by the Contractor. All the documents required during the project realization shall also be presented at this stage:</p> <ul style="list-style-type: none"> - Main goals of the project - All activities and key dates (milestones, etc.) - Activity code and description (freezing of design, outputs, etc.) - Detailed Schedule - activity duration and priorities - Communication matrix - Participants of project and responsibilities - Project risks (in area of the design process) - Project monitoring (regular meetings and/or teleconferences, regular progress reports, etc.)

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T1	Concept Design	<p>The Administration shall organise a meeting for the mutual review, verification and acceptance with the Contractor of the outputs, technical drawings, etc. including at least the following items of the Concept Design Process.</p> <ul style="list-style-type: none"> - Identification of key technical parameters of locomotives - Identification of key technical requirements for locomotives systems - Identification of applicable norms - Identification of main suppliers - Review and acceptance of the concept mechanical and electrical design of locomotive - Approval of design guidelines and detailed requirements, the standardisation of further works - Review of locomotive layout and main parameters - Review of the concept 3D design prepared by the Contractor (car body main structure, driver's cab, bogie, ...) - Submission of the Draft Quality Plan <p>The review meeting shall be concluded with minutes of meeting (MoM) signed mutually for the approval of the outputs completed until this stage and the identification of the plans of the upcoming activities.</p> <p>The layout, technical definitions and concept 3D models accepted shall form the basis of the Preliminary Design 3D modelling process.</p> <p>Details of all types of vehicles to be designed and manufactured (equipment, materials, components to be used; vehicle power, vehicle dimensions, interior and exterior trim equipment, equipment placements, etc.) will be defined at this stage.</p>
T2	Preliminary Design	<p>The Administration shall organise a meeting for the mutual review, verification and acceptance with the Contractor of the 3D models, outputs, technical drawings, etc. including at least the following items of the Preliminary Design Process.</p> <ul style="list-style-type: none"> - Definition of the locomotive's system design (Preliminary schemes, 3D data of carbody, bogie, driver's cabin, etc.) - Definition of Technical Specifications for suppliers proposals - Verification of suppliers technical proposals for locomotive's main systems - Review and acceptance of the preliminary mechanical and electrical design of locomotive - Review of the preliminary design 3D models prepared by the Contractor (car body, driver's cab, bogie, ...) - Review of the preliminary FEM calculations of bogie frame - Review of the preliminary FEM calculations of car body frame - Review of the preliminary dynamic analyses of locomotive <p>The review meeting shall be concluded with minutes of meeting signed mutually for the approval of the outputs completed until this stage and the identification</p>

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		<p>of the plans of the upcoming activities. The nomination of the suppliers of main systems is done in this phase.</p> <p>The technical definitions, preliminary design 3D models, all calculations and simulations accepted shall form the basis of the Detailed Design 3D modelling process.</p>
T3	Detailed Design	<p>The Administration shall organise a meeting for the mutual review, verification and acceptance with the Contractor of the 3D models, outputs, technical drawings, etc. including at least the following items of the Detailed Design Process.</p> <ul style="list-style-type: none"> - Consolidation of the locomotive's design (Schemes, 3D data of carbody, bogie, cabin, components integration, etc.) - Verification of component suppliers main systems development status - Definition of Technical Specifications for suppliers proposals (subsystems) - Verification of suppliers technical proposals for locomotive's subsystems - Review and acceptance of the detailed mechanical and electrical design of locomotive - Review of the detailed design 3D models prepared by the Contractor (car body, driver's cab, bogie, ...) - Review of the completed FEM calculations of bogie - Review of the completed FEM calculations of car body - Review of the completed FEM calculations of components attachments and substructures - Review of the completed CFD calculations of the air-conditioning (HVAC) - Review of the dynamic analyses of locomotive <p>The review meeting shall be concluded with minutes of meeting signed mutually for the approval of the outputs completed until this stage and the identification of the plans of the upcoming activities.</p> <p>The technical definitions, detailed design 3D models accepted shall form the basis of the Final Design 2D modelling process.</p>
T4	Final Design	<p>2D technical drawings shall be prepared by the Contractor as part of the mechanical design.</p> <p>As part of the electrical design, the preparation of the following falls in the scope of the Contractor:</p> <ul style="list-style-type: none"> - Electrical documentation based on the final version of electrical diagrams (assembly drawings, layout plans of electrical devices, ...) - 2D technical drawings of electrical cabinets, external cabling, cabling of machinery room, cabling of driver's cab.

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7. DOCUMENTATION

7.1. The documents to be submitted by the Contractor as part of the documentation are presented in this article and Annex-2. Although not included in this list, the Technical Documentation Package to be given by the Contractor must contain all the documentation necessary for the Administration to manufacture, assemble and test the National Co-Co Type Locomotives.

7.2. The Administration shall review all the documents delivered by the Contractor for their forming the basis of design, suitability for manufacturing, etc. If the Administration considers that the documents are insufficient, then they may request the document to be detailed, drawn up again, and if they consider it necessary, they may request additional documents to be prepared. The Contractor shall meet the Administration's additional requests free of charge.

7.3. The documents in the technical document package that will be prepared for being submitted to the Administration as the final version shall be submitted separately in a format protected against rewrite. In this case, the original version of the same documents allowing access to their content and making revisions shall also be submitted to the Administration for use in the format requested by the latter.

7.4. The Contractor shall prepare all the technical documents that the Contractor will submit in the scope of the work forming the subject matter of bidding in accordance with the relevant TSI/ EN/ UIC norms and submit them to the Administration. The Contractor is obligated to review such documents as well as the matters specified in the other articles of the technical specification and identify additional documents/ technical drawings, if any, that will be required and present such additional documents and drawings in the bidding documents and/or later in the design meetings and provide them.

7.5. The Contractor is responsible for the preparation in a timely fashion and accurately of all the documentation that is required to be prepared.

7.6. The Contractor shall make free of charge any design modifications that are likely to arise from the incorrect design (errors that will hinder the verification of the design and the certification of the locomotive in accordance with the relevant standards and, in particular, TSI) during the initial manufacturing of the National Co-Co Type Locomotive and/or from the improvements/developments considered appropriate and deliver them to the Administration.

7.7. As a result of the tests of the first locomotive that will be performed according to the requirements of particularly TSI and all the other norms referred to in the technical specifications, design modifications

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and manufacturing documentation that may be needed within the scope of the Contractor's responsibilities shall also be made by the Contractor free of charge. This process may continue until the delivery of the locomotive to the customer.

7.8. The Contractor shall submit all the technical documents delivered to Administration, along with the TSI technical file, following the completion of the TSI certification to the Administration with their latest revisions within 30 (thirty) business days.

7.9. Documents to be delivered in 3D Format by the Contractor

7.9.1. Final 3D design data shall be submitted to the Administration on CATIA V5-6 R2018 Service Pack3 platform (.CATProduct or .CATPart extension) for the mechanical data and on CATIA Harness module platform for the electrical data. Also, the BOM shall include material data, all piping and cabling elements, fastening elements, rubber materials and no item in this data shall be inaccessible/ non-viewable.

7.9.2. Complete 3D mechanical designs for Electric, Diesel Electric and Dual Mode locomotives (all the documents including manufacturing and purchasing components, fastening elements, brackets, FRP panels, piping and cabling for a locomotive at the car body, side wall, roof, frame, driver's cab and bogie level and of an integrated model) shall be submitted to the Administration in 3D format. The 3D data of the supplied components will be obtained from the suppliers and shared with the Contractor.

7.9.3. All documents including electrical cable conduits, switchboards, electrical cabinets (with equipment placement and supports inside the cabinet), control desk, control desk equipment and electrical-electronic components specified in the installation diagram and cabling

7.9.4. Vehicle interior and underframe piping designs

7.9.5. Harness diagrams including conduit, support, gland and connector information

7.9.6. Designs for the onboard integration of components (fastening elements, cabling locations, cable conduits, etc.)

7.10. Design Data to be Delivered in 2D Format by the Contractor

7.10.1. Metric system shall be used for the technical drawings and the technical drawings shall be prepared in CATIA V5-6 R2018 Service Pack3 (.CATDrawing or .CATPart) format for the mechanical data and in EPLAN Pro Panel and EPLAN Electric P8 2.9 or higher version (.zw1) format for the electrical data

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pursuant to EN 15016 and in line with the PLM system used in TÜRASAS Eskişehir Regional Directorate. (The guide document related to the PLM system will be shared with the Contractor by the Administration.) The documents to be included in the document package to be submitted to the Administration by the Contractor shall be prepared and forwarded in line with the Administration's PLM system with “-” revision.

7.10.2. The Contractor shall prepare complete 2D mechanical design for all three types of locomotives (bogies, frame, equipment welded to frame, piping, car body, driver's cab, cab trimming and equipment layout, control desk, roof, roof equipment, etc.) and 2D technical drawings for all the components and installation components for manufacturing and layout.

7.10.3. Electrical cable conduit layout diagrams (separately for the driver's cab, machinery room, underframe and roof), switchboard layout technical drawings, control desk technical drawings, fuse and relay control panel technical drawing and diagram, terminal block technical drawing and diagram, electrical equipment installation drawings and plans, electrical circuit diagrams and system function diagrams

7.10.4. Layouts for all three types of locomotives (document giving the designations of each equipment and each area of the locomotive), Cable Journals (document showing physical cabling routing in the locomotive), Wiring Diagrams (document showing harness routing in the locomotive), Device Connection Diagrams, Terminal diagrams and Plug-Socket diagrams

7.10.5. If the product used for all three types of locomotives is a product that will be purchased from the market, then 2D technical data showing the product specifications and installation interface details and describing the product well (describing both dimensions and materials) shall be prepared by the Contractor. (Document that is prepared with the numbering system, technical drawing letterhead and BoM letterhead macros to be provided by the Administration for PLM transfer, after the contract is signed)

7.10.6. Cabling formboards (separately for the driver's cab, mechanical room, panels, underframe, frame-top, roof, etc.) (E³ formboard design, production document / nail board 2D drawing)

7.10.7. Interior and underframe piping designs (All piping and cabling manufacturing drawings and assembly drawings)

7.10.8. Designs for the onboard integration of components (including fastening elements, cabling locations, cable conduits, etc.)

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7.11. Manufacturing Documents

In addition to the data extensions indicated in this Technical Specifications (for instance, dxf format shall also be submitted by the Contractor. apart from 3D-2D data required to be delivered for sheet plates):

7.11.1. BOM lists (The format will be shared by the Administration with the Contractor during the preparation of the final design)

7.11.2. Cable cutting list - as detailed in Excel to be approved by the Administration

7.11.3. Material lists

7.11.4. Sheet metal cutting and bending drawings

7.11.5. Welding drawings

7.11.6. Manufacturing drawings

7.11.7. Installation drawings

7.11.8. Installation/assembly plans

7.11.9. Welding and inspection reports

7.11.10. Detailed Paint Plan Drawings

7.12. Other Documents

7.12.1. For the locomotive in general, the preparation of TCMS functions and the scenarios and control forms of TCMS system functions and the development and elaboration of the interface matrix (As explained in the 3. DEFINITIONS clause)

7.12.2. Electrical installation design, cabling design, system integration plan, electrical installation testing and commissioning plans and the outputs complementary to these documents

7.12.3. Design Hand Book (its content is explained in article “Design Handbook”)

7.12.4. Maintenance manuals (Limited and General Revisions, etc.)

7.12.5. System Definition Documents (Sample document template will be provided by the Administration.)

7.12.6. Condition Based Maintenance (CBM) Documents

7.12.6.1. The Contractor shall integrate in the Maintenance plan, in manuals and in the diagnostic system the CBM method. The CBM method shall be applied in a system able to detect, elaborate and inform of the status of locomotive system and subsystems/components.

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7.12.6.2. The Contractor is responsible to define the CBM system approach. It shall interface with all subsystems and manage the definition of the relevant CBM algorithms, indexes and additional sensors.

7.12.6.3. The initial set of CBM algorithms shall be defined and validated during the locomotive commissioning and testing phase. Then, during the warranty period, the relevant FMEA shall be regularly updated, and the reliability indexes continuously monitored. At the end, the overall maintenance process shall be updated in order to incorporate the experience gained with the units supplied in the operational context.

7.12.7. A Guide Document showing the list of all required type and routine tests for the vehicle, as well as the tests required for TSI and TS EN IEC 61133, and in which order and how the tests will be performed.

7.12.8. Analysis reports (in the format specified in Annex-2)

7.12.9. Guide Document (To be prepared by the Contractor within 1 month after the NoBo compliance matrix is given to the Contractor by the Administration) and Certification Process Plan to be prepared according to NoBo compliance matrix (These documents to be prepared by the contractor will be prepared in coordination with NoBo.)

7.12.10. Documents to be prepared within the scope of Safety and RAM (PHA, HAZOP, Hazard Log, other documents in Safety Case, Fire Safety Concept, Fire Safety Inventory List, Failure Mode and Effect Criticality Analysis, LCC Analysis, etc.)

7.12.11. Common Safety Method - Risk Assessment (CSM-RA) documents - The Contractor shall, as part of consultancy for the Common Safety Method - Risk Assessment (CSM-RA), provide consultancy service for AsBo for the Administration free of charge in line with the project schedule during the Safety/Risk Management process according to the CSM (402/2013/EU) regulation executed by the AsBo appointed by the Administration. In this scope:

7.12.11.1. The Contractor is responsible for the preparation of all the documentation to the AsBo that will allow the successful completion of the Common Safety Method - Risk Assessment (CSM-RA) process in the templates to be determined by the project quality management (the preparation of Safety Plan/ Hazard Log/ Safety Fact Documentation (Technical Safety Cases, etc.)). The Contractor is responsible for access to and provision of all the necessary data during the preparation of this

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documentation, the setting of methodology, making the appropriate calculations and the submission of the results in the format requested by the AsBo.

7.12.11.2. The Contractor shall inspect the sub-components to be supplied by the Administration in accordance with the Risk Management and if there are unsuitable components, they will inform the Administration in respect thereof, together with their proposals for solution.

7.12.11.3. The Contractor is responsible for the identification of the “critical safety functions” to be assigned to the relevant subsystems in line with the Hazard Log at the locomotive level.

7.12.12. The Contractor is entirely responsible for sworn translations and their seals of apostille that may be required during the TSI Certification, type approval and test processes.

7.12.13. The Contractor’s personnel in charge of Certification and Risk Management shall review all the documentation to be delivered in the scope of this article and submit a report to the Administration, which report will form the basis of the approval.

8. TECHNICAL SUPPORT

Within the scope of the work subject to the tender, during the production, tests and certification process of the National Co-Co Type Locomotive, the Contractor shall provide technical support to the Administration free of charge, if requested by the Administration within the scope of the Contractor's responsibilities defined in this specification. This technical support may be online or face-to-face if required.

9. GENERAL PROVISIONS

9.1. Language and Number of Copies of Official Communications and the Work Forming the Subject Matter of Bidding

9.1.1. The language of all the technical communications and technical documents from the Contractor to the Administration may be Turkish or English, but the languages to be used in the final versions of those documents shall be Turkish and English. All the technical communications and documents from the Administration to the Contractor shall be in Turkish or English. The Contractor shall be responsible for the translation. The responsibility for the errors arising from the translation of the documents shall rest

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with the Contractor. In the event of any conflict, the Turkish copies of the documents submitted shall prevail.

9.1.2. The documents to be submitted to the Administration shall be prepared by the Contractor and submitted to the Administration in three printed copies each and in two electronic copies each in the form and format indicated in the technical specification and its annexes thereto within the set period.

9.1.3. The Contractor is entirely responsible for sworn translations and their seals of apostille that may be required during the TSI Certification, type approval and test processes. The Contractor's personnel in charge of Certification and Risk Management shall review all the documentation (design outputs, documents to be received from the suppliers, etc.) to be delivered in the scope of this article and submit a report to the Administration, which report will form the basis of the approval.

9.2. Software Licences

All the software (AutoCAD, CATIA, EPLAN, MS Office, FEM Analysis Programs, etc.) used by the Contractor shall be licensed. The Contractor is entirely responsible in this regard.

9.3. The Project Right of Usage

All kind of usage and property rights including sales, supply etc. of National Co-Co Type Mainline Locomotive designed in three different types within country and abroad and all design, project, information, document within scope of work which is subject matter of tender will belong solely to Administration without having any limitation.

9.4. Contractor's Personnel

9.4.1. Bidders shall submit in their bid documents the list of the personnel they plan to hire in the scope of this work (the list of personnel from the project and project management teams to be set up in the scope of the work). The CV's of personnel shall be included in the personnel list.

9.4.2. The Administration may request the Contractor to replace the personnel if the Administration considers it necessary following the contract signature. The Contractor is obliged to comply with this request.

9.4.3. If, during the work, it is requested that the Contractor's personnel are sent to the Administration's facilities, provided that the Administration gives a notification to that extent 5 (five) business days in

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advance, the Contractor shall send personnel having the qualifications requested by the Administration to the required locations. The Contractor personnel mentioned here are the personnel authorized to make decisions on behalf of the Contractor who will be in the Administration facilities in order to fulfil the obligations of the Contractor specified within the scope of this specification (technical support, etc.). The personnel shall remain at their posts until the fulfilment of their responsibility. The Contractor's personnel shall have good command of Turkish or English and work in the same environment together with the Administration's personnel, provided that the Contractor's personnel use their personal computers. The Contractor shall be responsible for all kinds of expenses (sustenance, boarding, communication, travel, insurance, equipment, etc.) of their personnel. If the personnel fail to meet the requirements, the Administration may request new personnel to be appointed.

9.4.4. The Contractor's personnel may need to work outside the Administration's site for the tasks (attendance in tests, etc.) to be delegated to them as part of the work forming the subject matter of bidding. In this case, the Contractor is responsible for taking all the necessary safety measures as well as obtaining the documents, certificates and permits that may be required for the Contractor's personnel. The Contractor's personnel must abide by the rules of the place where they are located. The Contractor shall be responsible for the flight tickets, hotel expenses, daily sustenance cost and in-city transportation costs of the Contractor's personnel, as well as the fee of Turkish interpreter, if any.

9.5. Delivery of Annexes

All the annexes in the scope of bidding shall be delivered to bidders following the signing of the Non-disclosure Agreement (NDA) Documents, the conditions of which will be determined by the Administration.

9.6. Documents Required to be Submitted in the Proposal Phase

Bidders shall present the following documents to TÜRASAS in their proposal.

- Clause by clause responses to this specification (for all articles, stating that they have been read, understood and accepted)
- Documents requested in the administrative specifications
- Unit price breakdown of work packages

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10. DESIGN HAND BOOK

10.1. Design hand book will be used to interpret documents which are provided during locomotive design verification and design development process over vehicle development work time schedule and follow development process.

10.2. Design hand books should include decision taking mechanism in vehicle development stages and stage transitions with detailed manner.

10.3. The design hand book should include at least the basic vehicle development stages given below.

- 1- Concept Design
- 2 - Basic Design
- 3- Detailed Design
- 4- Manufacturing
- 5- Validation

10.4. The Vehicle Development Work-Time Plan should show the inputs to each stage mentioned above and the activities carried out at that stage and all the outputs of that stage.

10.5. The Vehicle Development Work-Time Plan should be in MS Excel (.xls) or MS Project (.mpp) format. The document detailing the stage activities and inputs and outputs may be submitted in MS Word (.doc) format.

10.6. The design hand book should present in detail how the engineering calculations made during the vehicle development stages and simulation and/or test results will be evaluated, the possible problems these engineering calculations and simulation and/or test results might indicate, the solutions recommended for these problems and the steps that should be taken during the application of the solutions.

10.7. The design manual should clearly show the necessary criteria for the vehicle development stages to be considered successful.

10.8. The design manual should also show the aforesaid descriptions on a flow chart. If the flow chart is in the software of the Contractor, this document may be submitted as an image file (.jpg, .png or .bmp). The submission of the flow chart in parts may also be accepted.

10.9. The design manual should include the design process of the locomotive to be manufactured by the Administration as a model design process. The evaluation of the results (calculation, simulation and test)

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obtained from design processes, the decisions made and the results of the decisions should be given in detail on the model.

10.10. The design manual should be prepared by the Contractor and submitted to the Administration in MS Word (.doc) and Adobe Acrobat (.pdf) formats.

11. MATTERS FORMING THE SUBJECT OF INTELLECTUAL AND INDUSTRIAL PROPERTIES

11.1. Any certificate, design, document delivered to the Contractor and any entity, institution and persons the Contractor collaborates in the scope of the work forming the subject matter of the contract shall not be used for other purposes in any manner whatsoever and all kinds of use and property rights of the design, manufacturing, TSI certification of all parts of the National Co-Co Type Mainline Locomotive as well as all the tests performed until the locomotive is put into commercial operation and the test results shall exclusively belong to the Administration without limitation. These rights shall exclusively belong to the Administration, provided that the imperative provisions of the legislation in force are reserved and the nature and content of the product are not corrupted and the product is not used in a way giving harm to the image and prestige of the owner of the product.

11.2. The Contractor shall indemnify any damages arising from the third party's claims in respect of the violation of patent, trademark and/or industrial design rights by virtue of the use by the Contractor of all and/or any part of all kinds of information, certificates and documents relating to the National Co-Co Type Mainline Locomotive during the fulfilment by the Contractor of their contractual obligations.

11.3. If, during the fulfilment of the contractual obligations, the Contractor and any entity, institution and persons the Contractor collaborates violate any right and/or interest that is a protected intellectual and/or industrial property, all administrative, legal, penal and financial responsibilities arising therefrom shall belong to the Contractor. The Contractor may make no claim from the Administration in this regard. Nevertheless, if the Administration faces any legal sanction, they shall refer this sanction to the Contractor, with other rights reserved.

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11.4. The Contractor may not use any visual, technical, administrative and similar documents developed under this project for the purpose of promotion, reference, project document, etc. in any written, audio or other channel without the permission of the Administration.

11.5. The Contractor is responsible for all activities of the sub-contractors against the Administration in respect of any matter mentioned herein.

12. ANNEXES

Annex-1: Main Characteristics of Locomotives

Annex-2a: Table of Documents to be Submitted by the Contractor

Annex-2b: Documentation Format to be Submitted to the Administration