

RULES FOR SUBMISSION AND EVALUATION
OF TENDERS AND NEGOTIATIONS
Procurement identification number PIU-06

ANNEX №3

Joint Stock Company "O'zbekiston Temir Yo'llari"
T. Shevchenko str., 7
Tashkent, Republic of Uzbekistan

(place) (date)

**TENDER FORMS FOR MAINTENANCE, DOCUMENTATION, TRAINING AND
ENERGY CONSUMPTION**

**Section I. TENDER FORMS FOR MAINTENANCE OF ELECTRIC TRAINS
(INCLUDING THE STOCK OF SPARE PARTS AND EQUIPMENT NECESSARY FOR
MAINTENANCE)**

Chapter 1. Technical description of the electric trains

The Supplier shall provide a general technical description of the electric trains. There is no requirement to fulfil a specific format.

Chapter 2. Maintenance of electric trains

The Tenderer shall use the template provided below to submit a maintenance plan with all the necessary preventive and corrective (unscheduled repair) maintenance works within the service life of the electric train.

The maintenance plan should list all necessary levels of anticipated maintenances and repairs (maintenance levels), their intervals and number during the service life of the electric train, as well as other necessary information to ensure complete maintenance of electric trains during their entire service life.

Maintenance plan

No.	Maintenance level	Interval, (km or days)	Number during service life	Notes
1.				
2.				
3.				

The Tenderer shall use the template provided below to submit information about intervals of maintenance and repair of individual systems, assemblies and units of the electric train,

which should be adapted to the general maintenance plan.

The Tenderer should specify the list of all necessary anticipated maintenance and repair works, detailing each item, specifying works to be performed, as well as other necessary information to ensure complete maintenance of electric trains during their entire service life.

Intervals for maintenance and repair of individual systems, assemblies and units of electric trains

No.	Actions during maintenance or repair of assemblies, units or systems	Maintenance level 1	Maintenance level 2	...	Maintenance level n-1	Maintenance level n	Notes
1.							
2.							
3.							

The Tenderer shall use the form provided below to submit the list of the stock of necessary spare parts, as well as to specify information on possibilities of purchasing spare parts and materials necessary for maintenance within a period five years.

Spare parts for preventive maintenance of electric trains during 5 (five) years according to the maintenance plan

No.	Name	Quantity	Price per unit
1.			
2.			
3.			

Recommended capital spare parts for corrective (unscheduled) repairs during a period of 5 years

No.	Name	Quantity	Price per unit
1	Decorative finish module of the driver's cab.		
2	Glasses of front and side windows of the driver's cab		
3	Window glasses of the passenger compartment without a ventilation window		
4	Window glasses of the passenger compartment with a ventilation window		
5	Sets of outer doors (with control block)		
6	Glasses of outer doors		

No.	Name	Quantity	Price per unit
7	Luggage shelves		
8	All types of handles and rails		
9	Replaceable parts of passenger seats		
10	Glasses of partition walls of passenger areas (if any)		
11	Passenger area lighting elements		
12	Current collector		
13	Front automatic coupler		
14	Information system displays or panels for passenger areas		
15	Headlight		
16	Ditch light and other signal lamps		
17	Front window wiper		
18	Rear-view mirrors		
19	Electric traction motors		
20	Traction current converter (with control block)		
21	Auxiliary converters		
22	High-speed circuit breaker		
23	Air conditioner for the passenger area (with control block)		
24	Air conditioner for the driver's cab (with control block)		
25	Runners of current collectors		
26	Air compressor		
27	Auxiliary air compressor (if any)		
28	Air distributor		
29	Anti wheel slip device (with control block)		
30	Set of motorised bogies		
31	Set of non-motorised bogies		
32	Technological bogies for movement of electric trains (only for electric trains with Jacobs bogies)		
33	Intercar coupling adapter to be coupled with an SA type automatic coupler		
34	Motorised wheelsets		
35	Non-motorised wheelsets		
36	Informative system elements		
37	Video system elements (including video surveillance cameras)		
38	Brake system elements		
39	Brake control system		
40	Driver's seat for the driver's cab		
41	Sun blinds for the driver's cab		
42	Set of spare parts intended by the supplier of the sanitary		

No.	Name	Quantity	Price per unit
	facility with control block		
43	Air suspension air bags for motorised bogies		
44	Air suspension air bags for non-motorised bogies		
45	Driver's brake controller		
46	Driver's traction controller		
47	Train control and protection system or equivalent		
48	Memory module of the Train Control and Protection system or equivalent		
49	Train radio station		
50	Elements of the electronic control system		
51	Route signs and information system elements		
52	Elements of the passenger registration system		
53	Elements of the ticket validation system		
..	Other		

The Tenderer uses the form provided below to submit the List of equipment necessary for maintenance of electric trains, specifying its characteristics.

List of equipment necessary for maintenance of electric trains

No.	Name and short characteristics (for example, power, size, weight, scope and frequency of tests, warranty period, service life)	Quantity
1.	Electric train driving simulator with a control panel, monitor, software and equipment, where it is possible to model different operation modes, situations and damages	
2.	Stationary diagnostic and testing unit for the Train Control and Protection system or equivalent	
3.	Portable diagnostic and functional configuration unit for the Train Control and Protection system or equivalent	
4.	A device for generation of electronic maps	
5.	Workplace equipment for automatic decryption of recorded motion parameters with respective hardware	
6.	Connection cables necessary for diagnostics of all computerised systems	
7.	Portable diagnostic computers in a shockproof housing	
8.	Underfloor unit for machining of wheelsets	
9.	Wheelset diagnostic benches	
10.	Test benches for safety devices	
11.	Equipment necessary for repair and replacement of electric train parts	
12.	Stationary servers	

13.	Kits of manual special tools necessary for full maintenance	
...	Other equipment necessary for maintenance in the opinion of the Supplier	

The Tenderer uses the form provided below to submit the list of all software with usage manuals and licences, which are necessary for the operation and maintenance of the electric train.

List of copies of software and servers, which are necessary for operation and maintenance of electric trains

No.	Name	Quantity
1.	Software for computerised systems of electric trains	
2.	Software for diagnostics of all systems of electric trains	
3.	Data processing software	
4.	External stationary servers	
...	Other	

Section II. TENDER FORM FOR DOCUMENTATION OF ELECTRIC TRAINS

General

1. All Documentation, instructions and operating manuals and any further printed materials supplied by the Supplier to the Customer as defined in the Procurement Object shall be up-to-date and contain all information necessary for Customer to be able to verify the compliance of all obligations of the Supplier arising from this Contract and to be able to use, operate, maintain, repair and overhaul the Procurement Object.
2. All documentation shall be complete and free of errors.
3. The Supplier must deliver the Documentation to the Customer as defined under Annex №13 (section 10) "Draft of the Contract" and the Technical Specification section 5 and section 7.
4. Customer is hereby granted a non-exclusive transferable right to use, including but not limited to the right to copy, all documentation for the permitted purposes.
5. All documentation shall be in Russian and English language in hard copy and electronic format, unless agreed otherwise in writing between the Customer and the Supplier.
6. All documentation shall be issued both in hardcopy and digital form. The format of the digital form shall be agreed between the Customer and the Supplier after signature of this Contract.
7. The Supplier is obliged to keep all documentation available from acceptance of the first car until the end of the technical life cycle of the last car.

Documentation for Certification

1. The Supplier shall supply to Customer all documentation which is provided to the "notified body" or any other party in connection with certification of the electrical trains.
2. The Supplier shall, after certification, provide the Customer with comprehensive and complete files of the certification documentation both in hardcopy and digital form.

Documentation for operation of electric trains

The Supplier shall supply operation manuals of the electric train to the Customer which must be prepared in a way to train the operating personnel.

Documentation for maintenance

1. The Supplier shall supply all documentation with respect to maintenance (including the documentation for repair of damage and overhaul) to enable qualified maintenance personnel to perform maintenance on the electric trains effectively until the end of the technical life cycle.
2. The Supplier shall supply all documentation necessary to enable the Customer to purchase from the Supplier or from third parties all Spare Parts required for maintenance.

Chapter 3. Technical Documentation

The Tenderer shall provide information on the technical documentation, which the Tenderer is planning to deliver to ensure operation and maintenance of electric trains. The list of documents, as well as the type of delivery of the Documentation to the Customer should be specified. Minimum requirements related to the technical documentation are defined under the Technical Specification section 5 and section 7.

Section III. TENDER FORM FOR STAFF TRAINING

General

The Supplier shall provide training to operate, maintain and repair the electric trains in compliance with all contractual obligations.

1. The Supplier shall complete the training by the date as defined under Annex №13 "Draft of the Contract" (section 10).
2. All specifically dedicated means of assistance used by the Supplier for the training, including but not limited to documentation, hardware and software shall be placed at the disposal of Customer both in hardcopy and digital form. If resources other than documentation are involved, they must be made available thirty (30) calendar days before Supplier is to provide the training, in a form and location to be agreed upon by the Supplier and the Customer.

3. The Documentation with respect to training shall be in Russian language and in a form that is suitable for copying. Customer shall have the right to make copies for its own use for the mentioned educational purposes.
4. The training of Customer instructors as set out above will be conducted in Russian language.

Chapter 4. Staff training

The Tenderer shall provide information on the programme of staff training to the Customer. The scope of the training programme, the list of training aids should be specified, including table FIN-17 in Financial bid (Annex No.6 to the Tender Rules). The Tenderer should submit a description according to provisions of section 8 of the Technical Specification.

Technical Tender forms
Annex 1

PROCEDURE OF CALCULATION OF ELECTRICITY CONSUMPTION

Chapter 5. Energy consumption

1. The Tenderer should prepare a simulation of the average electricity consumption of the electric train on the route Tashkent-Hojikent based on the requirements defined in this document. The information about section profile, stops and timetable can be found in Annex A and B to this Procedure.
2. When calculating electricity consumption of an electric train, the following provisions should be taken into account:
 - a) The train is fully loaded with the maximum capacity of passengers as defined in the Technical Specification section 2 (all passenger seats, folding seats and standing places are occupied), the average weight of one passenger is 70 kg;
 - b) nominal voltage in the contact line system – 25 kV AC
 - c) outdoor air temperature → + 20°C ±5 °C;
 - d) wind speed of 10 m/s ± 2 m/s;
 - e) at each stop a dwell time as defined in Annex B of this document with access doors opening and closing at one side of the electric train shall be considered;
 - f) electrodynamic braking mode – rheostat braking (without electricity output to the contact line system);
 - g) electricity consumption starts to be registered, when the electric train starts moving from the departure station and the end of registration of consumption is when the electric train arrives to the destination station (train at standstill);
 - h) All propulsion and auxiliary systems shall be running during the test ride. This includes at least the following equipment in the electric train:
 - 1) electric train control system;
 - 2) movement safety system;
 - 3) compressor unit;
 - 4) battery charging unit;
 - 5) radio communications of the train in the driver's cab;
 - 6) tail lamps;
 - 7) buffer lamps;
 - 8) headlight;
 - 9) battery charging unit;
 - 10) toilet facility;
 - 11) passenger information system;
 - 12) video surveillance system;
 - 13) lighting in passenger areas;
 - 14) Climatic equipment of the electric train, which ensures air temperature in passenger areas and in the driver's cab +21°C ± 1°C.

For the calculation the line shall be considered not receptive (only rheostatic braking possible).

The tenderer should submit details of the two components indicated in the formula. Further details may be required in case of lack of clarity in the submitted Documentation.

Calculations should be performed considering the auxiliary consumption (AC and DC) under the condition listed above. Auxiliary loads details shall also be submitted in the offer. Additional boundary conditions to be considered for the energy calculation:

Calculation should be performed considering new wheels and the following resistance formula:

$$R=A+B*V+C*V^2,$$

where:

A - rolling resistance component independent of train speed, this term can also contain an allowance for "internal" mechanical friction.

B - coefficient used to define train resistance dependent on train speed

C - streamlining coefficient used to define train resistance dependent on the square of the train speed, can include information about the frontal surface area of the wagon, and an allowance for the drag created by the wagon.

D - aerodynamic coefficient or polynomial function used to further define train resistance, often combined with C.

V - train speed

With A, B and C to be estimated by the Supplier according to the vehicle characteristics and provided information on the route to be used for the simulation. A, B, C values and how they have been calculated shall be submitted as part of the documents produced by the Supplier to answer to clause 2-10.1.1 of the Technical Specification: "Running simulation shall be submitted in the offer. The simulations shall be performed considering the auxiliary loads active."

Complete details to provide evidence on how the coefficient A, B and C have been calculated shall be submitted in the offer. Customer is entitled to ask for further details.

The average electricity consumption of the electric train on the route is calculated according to the following formula:

$$E = (E_{pbn} + E_{pb}) \times \left(\frac{78000}{(L)} \right) \times 30 \times q$$

Total cost of energy consumption exceeding the energy consumption offered in the tender for 1 electrical train over the lifetime of the electrical train:

$$\Delta E = (\Delta E) \times \left(\frac{78000}{(L)} \right) \times 30 \times 0.05,$$

where:

E – total electricity consumption of all 34 electric trains during 30 years, which is

calculated

E_{pnb} - energy Consumption at pantograph during “non braking” on route Tashkent-Hojikent

E_{pb} - energy Consumption at pantograph during “braking” on route Tashkent-Hojikent

L - length in km of Tashkent-Hojikent route

78000 – average kilometrage of an electric train per 1 year;

q – number of delivered electric trains (34);

30 – the service life of an electric train assumed in calculations;

0.05– price of 1 kW/h in USD;

ΔE – difference between the actual consumption and the calculated consumption of the electric train based on the data provided for the reference line; as defined under Annex №9 “Procedure of verification of the actual electricity consumption” to the Contract.

Annex A

Tashkent (South Station) - Hojikent sector profile

Station	Distance pole, km	Slope, ‰	Length, m
Tashkent (South Station)	3376.0+0	5.3	600
	3375.4+0	1.9	400
Tukumachi	3375.0+0	-5.9	6100
Tashkent Pass.	3368.9+0	-9	600
	3367.5+0	-3.3	300
	3367.2+0	-12.1	500
	3366.7.0	-7.1	900
Salar	3365.8+0	-0.4	600
	1.4+0	2.4	200
	1.6+0	5.6	400
	2.0+0	0	100
	2.1+0	6	300
	2.4+0	1.7	200
	2.6+0	-2.9	300
	2.9+0	3.6	260
	3.1+60	10.1	540
	3.7+0	6.3	100
	3.8+0	10.5	400
	4.2+0	8.2	200
	4.4+0	8.4	300
	4.7+0	5.1	200
	4.9+0	10.9	300
	5.2+0	8.8	300
	5.5+0	5.1	200

Station	Distance pole, km	Slope, ‰	Length, m
	5.7+0	9.9	600
	6.3+0	6.7	300
	6.6+0	8.1	500
	7.1+0	1.01	1500
	8.6+0	9.3	900
Nurkhayot	9.5+0	3.6	300
	9.8+0	-2.6	300
	10.1+0	-8.7	730
	10.8+30	3.7	270
Kadirya	11.1+0	10.9	900
	12.0+0	5.6	1800
	13.8+0	11.9	200
	14.0+0	8.8	2900
	16.9	-0.2	550
	17.4+50	4.8	1050
	18.5+0	-5.3	600
	19.1+0	8.3	500
	19.6+0	-0.3	800
	20.4+0	1.9	300
	20.7+0	-3.1	200
Baitkurgan	20.9+0	1.4	300
	21.2+0	8.4	5100
Bozsu	26.3+0	9.0	600
	26.9+0	5.1	2200
	29.1+0	8.5	3400

Station	Distance pole, km	Slope, ‰	Length, m
Chirchik	32.5+0	2.3	500
	33.0+0	7.0	2900
	35.9+0	4.6	450
	36.3+50	8.9	3350
Aranci	39.4+0	0	300
	39.7+0	5.3	900
	40.6+0	-1	300
	40.9+0	0.7	130
	41.2+0	-2.3	100
	41.3+0	2.9	600
	41.9+0	6.8	4100
	46.0+0	-6.9	700
	46.7+0	0.2	300
	47.0+0	-6.4	100
	47.1+0	6.3	1200
	48.3+0	9.4	1400
	49.7+0	5.6	1100
	50.8+0	10.4	4200
Barrage	55.0+0	3.8	1000
	56.0+0	-2.1	700
	56.7+0	4.3	400
	57.1+0	8.9	200
	57.3+0	0	300
	57.6+0	8.6	2600
	60.2+0	0.1	200

Station	Distance pole, km	Slope, ‰	Length, m
	60.4+0	6.5	400
	60.8+0	4.9	1300
	62.1+0	9.1	1200
	63.3+0	2.1	150
	63.4+50	-4.8	950
Hojikent	64.4+0	8.5	1100
	65.5+0		

ANNEX B

Train schedule on the Tashkent (South Station) - Hojikent section

Station (stop)	Distance from Tashkent (South Station), km	Travel time, sec	Parking time, sec.
Tashkent (South Station)	0	-	-
Tukumachi	2,1	180	60
Tashkent Pass.	6,51	420	60
Salar	10,82	600	180
Shahriabad	15,11	540	60
Feruza	17,82	150	90
Yalangach	19,58	180	60
Kadirya	23,04	180	60
Kibray	26,27	180	60
Botany	29,91	180	60
Akkavak	32,47	360	60
Pulatkuyuvci	35,02	180	60
Bozsu	38,31	180	60
Navoy	40,87	180	60
Chirchik	42,35	240	60
OP Aranci	45,78	180	60
Aranci St.	49,52	180	60
Pargos	52,6	180	60
Iskander	55,08	180	60
Barrage	57,36	300	60
Gazalkent	58,61	420	60
Bostanlyk	59,64	240	60
53 km	61,13	240	60
Karankul	70,13	360	60
Hojikent	74,8	300	60
Total:	74,8	6330	1590
Total travel time:		7920 (2:12 hours)	

Train schedule on the Hojikent - Tashkent (South Station)

Station (stop)	Distance from Hojikent station, km	Travel time, sec	Parking time, sec.
Hojikent	0	-	-
Karankul	4,67	420	60
53 km	13,67	300	60
Bostanlyk	15,16	240	60
Gazalkent	16,19	300	60
Barrage	17,44	480	60
Iskander	19,72	240	60
Pargos	22,2	180	60
Aranci St.	25,28	300	60
OP Aranci	29,02	180	60
Chirchik	32,45	180	60
Navoy	33,93	180	60
Bozsu	36,49	240	60
Pulatkuyuvci	39,78	180	60
Akkavak	42,33	240	60
Botany	44,89	240	60
Kibray	48,53	180	60
Kadiya	51,76	360	60
Yalangach	55,22	180	60
Feruza	56,98	150	90
Shahriabad	59,69	180	60
Salar	63,98	240	180
Tashkent pass.	68,29	480	60
Tukimachi	72,7	360	60
Tashkent (South Station)	74,8	240	60
Total:	74,8	6270	1590
Total travel time:		7860 (2:11 hours)	