Tacis

Feasibility Study of New Terminal Facilities in the Georgian Ports

Phase 3 Report: Vol. III - Port Handling Equipment Port of Batumi

May 1998

Demand of Port Cargo Handling Equipment in the Different Development Phases of the Port of Batumi

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Technical Specifications

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7	60-t/ 40' Roll Trailer
8	Goose Neck
9	10-t Forklift Truck / Stuffer
10	2.5-t Forklift Truck / (4 m)
11	2.5-t Forklift Truck / Stuffer
13	Electric Hand Pallet Truck
14	Wheel Loader / Bobcat
15	"HANSE" Pallet
17	Workshop Equipment

Equipment should only be purchased for Phase I with a duration of five years.

2.2 Handling Equipment for the Existing Port Area

In addition to the cargo handling equipment required for the first step of port development the following items necessary for the operation of the existing port area have been defined. Technical Specifications are attached in part 4 of this volume.

		Phase I	Phase II	
Item N°.	**Description**	**Quantity**	**Quantity**	**Total Units**
5	Terminal Tractor	0	1	1
7	60-t/ 40' Roll Trailer	0	4	4
9	10-t Forklift Truck / Stuffer	1	1	2
10	2.5-t Forklift Truck / (4 m)	6	2	8
11	2.5-t Forklift Truck / Stuffer	10	4	14
13	Electric Hand Pallet Truck	5	5	10
14	Wheel Loader / Bobcat	4	0	4

1. Introduction

Based on the traffic forecast for the Port of Batumi it has been mutually decided by the port management and the Consultants to reconstruct in a first step of development the multi-purpose terminal of the port. In accordance with the terms of reference of the present project the Consultants have defined the necessary equipment which has to be purchased for this first development phase. This equipment is specified in the attached technical specifications.

In addition to the definition of the equipment for this first development step, equipment necessary to rehabilitate the existing port facilities has been specified. These specifications are also attached in this volume.

Also, the equipment estimated to be required in the second and third phase of port development have been defined and specified in the following chapters of his report.

Furthermore, the required rehabilitation of existing port handling equipment has been defined and a rehabilitation programme with cost estimates has been added to this report.

It is recommended to combine the tendering for the equipment of the ports of Poti and Batumi in order to receive competitive prices and for the purpose of standardisation of the equipment.

2. New Port Cargo Handling Equipment

2.1 Handling Equipment for the Multi-Purpose Terminal

In the following table the handling equipment required for operation of the multi-purpose terminal has been defined. Technical Specifications of the equipment are attached as part 4 of this volume.

The item number refers to the item number stated in the detailed technical specifications of the Tender Documents.

		Phase I	Phase II	Phase III	
Item N°.	**Description**	**Quantity**	**Quantity**	**Quantity**	**Total Units**
4	Reach Stacker	2	1	2	5
5	Terminal Tractor	1	2	1	4
6	38-t/40' Container Chassis	4	8	0	12
7	60-t/ 40' Roll Trailer	4	0	0	4
8	Goose Neck	1	0	0	1
11	2.5-t Forklift Truck / Stuffer	0	2	4	6
15	"HANSE" Pallet	1500	1500	1500	4500
17	Workshop Equipment	1	0	0	1

3.3 Summary of Equipment for Multi-purpose Terminal

3.3.1 Phase I

Port Handling Equipment: USD 1,452,200

3.3.2 Phase II

Port Handling Equipment: USD 999,000

3.3.3 Phase III

Port Handling Equipment: USD 1,153,000

3.4 Summary of rehabilitation costs

3.4.1 Port handling equipment

Phase I 1998

All of the following equipment has to be repaired within this year without a priority ranking in the following list.

Asset No	Type of equipment	Rehabilitation costs in USD
26	Ganz crane 5 t.	380.000
27	Ganz crane 5 t.	380.000
28	Ganz crane 5 t.	380.000
29	Ganz crane 5 t.	380.000
32	Albatros 10 t.	650.000
33	Albatros 10 t.	650.000
89	Toyota FLT 1.5 t.	5.000
90	Toyota FLT 1.5 t.	12.000
91	Toyota FLT 1.5 t.	10.000
92	Toyota FLT 1.5 t.	3.000
93	Toyota FLT 1.5 t.	3.000
94	Toyota FLT 1.5 t.	2.000
95	Toyota FLT 4 t..	5.000
96	Toyota FLT 4 t..	10.000
97	Toyota FLT 10 t..	2.000
56	Toyota FLT 4 t..	5.000
212	Komatsu Wa 220	3.000
213	Komatsu Wa 220	5.000
219	Bobcat 843	15.000
220	Bobcat 843	15.000
Subtotal		2.915.000
10% Contingency		291.500
Total		**3.206.500**

3. Demand of new cargo handling equipment and rehabilitation programme of existing equipment of the Port of Batumi (Phase 2 Report)

During the first Phase of this project a thorough evaluation of the existing cargo handling equipment has been executed (see Annex 8, Phase 1 report).

Based on the traffic forecast, expected cargo flow and the berth occupancy rate the required port handling equipment was chosen for rehabilitation. Detail concerning type of equipment and costs for rehabilitation and new investment are shown on the following pages.

3.1 Summary of rehabilitation costs

3.1.1 Phase I 1998

	Total Price in USD
Port handling equipment	2.915.000
Port fleet	495.000
Subtotal	3.410.000
10% Contingency	341.000
Total, Phase I	**3.751.000**

3.1.2 Phase II

	Total Price in USD
Port handling equipment	1.485.000
10% Contingency	148.500
Total, Phase II	**1.633.500**

3.2 Summary of New Port Handling Equipment

3.2.1 Phase I 1998 - 2002

Port Handling Equipment: USD 926,200

3.2.2 Phase II 2003 - 2007

Port Handling Equipment: USD 576,400

3.2.3 Phase III 2008 - 2012

Port Handling Equipment: USD 926,200

Cranes No 21 has low priority and should be replaced by Ganz No 22.

The Ganz cranes have a lower power consumption than the Albatros cranes have during handling of less than 5 t general cargo.

3.5.2 Cranes, Manufacture Takraf Eberswalde:

Asset No	Type of equipment	Year of construction	Rehabilitation cost in USD	Priority
No 25	Abus 10 t.	1968	650.000	last priority
No 30	Albatros 10/32m.	1977	600.000	second priority
No 31	Albatros 10/32m.	1977	600.000	second priority
No 32	Albatros 10/32m.	1982	650.000	first priority
No 33	Albatros 10/32m.	1990	650.000	first priority
Subtotal Takraf			**3.150.000**	

Crane No 33 should be repaired first and then shifted to berth No 7 to have 4 x cranes for operation there.

3.5.3 Pneumatic Grain Unloader, Manufacture Hartman:

Asset No	Type of equipment	Year of construction	Rehabilitation cost in USD	Priority
No 11	150t/h	1975	300.000	last priority
No 12	150t/h	1975	300.000	last priority
Subtotal Grain Unloader			**600.000**	

The grain unloader should be kept alive, but receive no complete overhaul as their productivity with grain is only 85 t/h each , which is less than the 120 t per hour of the Albatros cranes with grab operation achieve with less investment and power consumption.

The upgrading to 150 t/h grain or more would require a complete overhaul which would range by approximately $ 1.0 mio. per crane. Increase of grain handling above the level of 1995 according to the traffic forecast is only expected in Phase III 2008 - 2012. In this case new pneumatic unloader combined with a large buffer silo inside the port would ease the grain handling operation.

The other possibility would be the replacement of the pneumatic unloaders by Albatros type cranes allowing handling of general cargo and grain on berth No 8.

In addition the cranes which were rehabilitated in Phase I will need a new rehabilitation after ten years.

3.5.4 Forklifts

The existing equipment should be rehabilitated, new equipment should only be purchased after the completion of the civil construction.

Phase II

Phase II should follow directly after completion of Phase I with priority repairs of the forklift trucks (FTL).

Asset No	Type of equipment	Rehabilitation costs in USD
24	Ganz crane 5 t.	400.000
30	Albatros 10 t.	600.000
31	Albatros 10 t.	600.000
38	Toyota FLT 1.5 t.	15.000
54	Toyota FLT 1.5 t.	10.000
55	Toyota FLT 1.5 t.	10.000
57	Toyota FLT 1.5 t.	10.000
62	Toyota FLT 1.5 t.	10.000
214	Bobcat 843	15.000
215	Bobcat 843	15.000
Subtotal		1.485.000
10% contingency		148.500
Total		**1.633.500**

3.5 Required Rehabilitation Measures by Type of Equipment

In the port of Batumi only one crane can be repaired at present time. The crane must be removed from the quay side to allow uninterrupted operation. The cranes cannot move freely between the Berths 6 and 9. And 5 t. Ganz

From the existing port handling equipment following units should be rehabilitated:

3.5.1 Cranes, manufacturer: Ganz

Asset No	Year of construction	Rehabilitation cost in USD	Priority
No 21	1965	380.000	last priority
No 24	1967	400.000	second priority
No 26	1968	380.000	first priority
No 27	1968	380.000	first priority
No 28	1968	380.000	first priority
No 29	1978	380.000	first priority
Subtotal Ganz Cranes		**2.300.000**	

Crane No 22, from 1985 damaged by a ship and dismantled should be repaired by the Port itself, as spare parts are already with the Port and a contract between the port of Batumi and Ganz for rehabilitation is existing. A downpayment for spare parts $ 140.000 was paid and $ 500.000 remains for payment.

The Ganz cranes are needed for general cargo handling, especially bagged cargo.

3.6 New Port Handling Equipment

3.6.1 Phase I 1998 - 2002

Units	Type of equipment	Purchasing price in USD	Total price in USD
10	FLT 2.5 t.	35.000	350.000
6	FLT 2.5 t.	37.000	222.000
4	Bobcat 0.4 m3	40.000	160.000
1	FLT 10t.	85.000	85.000
5	Elec. hand pallet truck 1.5 t.	5.000	25.000
1	Spare parts item 1 - 5/10 %	85.000	84.000
Total			**926.200**

The equipment shall only be delivered after the completion of the civil constructions along **Berth** 9+8. The FLT 10t. will be used for heavy lifts and internal transportation of platforms. In addition the FLT could be used on the multipurpose terminals for stacking the empty containers with telescopic side frame spreaders. Optional price is $ 20.000.

The electrical hand pallet trucks shall be used inside the railway wagons for palletised cargo and/or inside the warehouse for single transportation.

For the crane operation modern stevedoring equipment should be purchased for increasing the productivity i.e. C -hooks, pallet cages etc.

3.6.2 Phase II 2003 - 2007

Units	Type of equipment	Purchasing price in USD	Total price in USD
4	FLT 2.5 t.	35,000	140,000
2	FLT 2.5 t 4m.	37,000	74,000
1	FLT 10 t.	85,000	85,000
5	Elec. Handpallet Truck	5,000	25,000
1	Terminal tractor	100,000	100,000
4	Roll trailers	25,000	100,000
1	Spare parts 1-6/10%	52,400	52,400
Total			**576,400**

The terminal tractor and the roll trailers will be used to transport general cargo from Berths No 8,6 to a new warehouse at the Berth No 9. The number of FLT are increased to cope with the increase of the indirect cargo handling.

Asset No	Type of equipment	Year of construction	Rehabilitation cost in USD	Priority
No 38	1989	Toyota 1.5 t	15.000	second priority
No 39	1989	Toyota 1.5 t	15.000	last priority
No 40	1989	Toyota 1.5 t	15.000	last priority
No 41	1989	Toyota 1.5 t	15.000	last priority
No 47	1989	Toyota 1.5 t	15.000	last priority
No 54	1989	Toyota 1.5 t	10.000	second priority
No 55	1991	Toyota 1.5 t	10.000	second priority
No 57	1991	Toyota 1.5 t	10.000	second priority
No 62	1983	Toyota 1.5 t	10.000	second priority
No 89	1993	Toyota 1.5 t	5.000	first priority
No 90	1993	Toyota 1.5 t	12.000	first priority
No91	1993	Toyota 1.5 t	10.000	first priority
No 92	1993	Toyota 1.5 t	3.000	first priority
No 93	1993	Toyota 1.5 t	3.000	first priority
No 94	1993	Toyota 1.5 t	2.000	first priority
No 56	1991	Toyota 4 t	5.000	first priority
No 95	1993	Toyota 4 t	5.000	first priority
No 96	1993	Toyota 4 t	10.000	first priority
No 97	1993	Toyota 10 t	2.000	first priority
Total FTL			172.000	

3.5.5 Wheel loader

Asset No	Type of equipment	Year of construction	Rehabilitation cost in USD	Priority
No 212	1994	Komatsu Wa 200	3.000	first priority
No 213	1994	Komatsu Wa 200	5.000	first priority
No 214	1988	Bobcat 843	15.000	second priority
No 215	1988	Bobcat 843	15.000	second priority
No 219	1990	Bobcat 843	15.000	first priority
no 220	1990	Bobcat 843	15.000	first priority
Total Wheel Loader			**68.000**	

Komatsu can be used for civil works inside the port during the demolishing and reconstruction which is to be realised by the Port itself.

The Bobcats are used inside the grain ships to collect the remaining grain for grab handling to increase productivity

No Phase II is required.

3.8 Multi Purpose Terminal

3.8.1 Phase I after construction

The following equipment is required for cargo handling operation.

Unit	Type of equipment	Purchase cost in USD	Total cost in USD
2	Reachstacker	370.000	740.000
4	FLT 2.5t	35.000	140.000
1	Terminal tractor	100.000	100.000
4	Roll tailor 40/60 t.	18.000	72.000
4	Container Chassis 40'/38 t.	25.000	100.000
1	Spare Part items 1-5	115.200	115.200
1500	Pallets 2 t. hanse	50	75.000
1	Workshop equipment	100.000	100.000
1	Gooseneck + Stand	10.000	10.000
Total			**1.542.200**

In theory one Reachstacker would be enough to handle the quantity of containers as predicted in the traffic forecast. In case of M+R or downtime no container handling on the Multipurpose terminal would be possible. In the port is no alternative equipment. For this reason the quantity was doubled.

3.8.2 Phase II 2003-2007

Unit	Type of equipment	Purchase cost in USD	Total cost in USD
1	Reachstacker 40t	370.000	370,000
2	FLT 2.5t	35,000	70,000
2	Terminal tracktor	100,000	200,.000
8	container chasses 40/38 t.	25,000	200,000
1	Spare parts item 1-3/10%	84,000	84,000
1500	Hanse Pallets	50	75,000
Subtotal Phase II			**999,000**

3.6.3 Phase III 2008 - 2012

Units	Type of equipment	Purchasing price in USD	Total price in USD
10	FLT 2.5 t. stuffer	35,000	350,000
6	FLT 2.5 4m.	37,000	222,000
4	Bobcat 0.4 m3	40,000	160,000
1	FLT 10 t .	85,000	85,000
5	Elec. Handpallet Truck	5,000	25,000
1	spare parts 1-5/10%	84,200	84,2000
Total			**926,200**

Depending on the utilisation of the following equipment purchased in Phase I i.e. FLT 2.5 t., FLT 10 t, Elect. Hand-pallet Trucks and Bobcats will reach their theoretical end of lifetime and have to be replaced during Phase IIII.

3.7 Port Fleet Batumi

The Port fleet consists of fleet of 13 ships and 1 barge.

Two ships are used for tourist passenger trips along the coast. These ships can not be recognised as related to port business. Therefore no M+R costs should be spent out of a EU budget. Another passenger boat was sold by the port after the evaluation phase.

The following ships should receive M+R directly in 1998:

1) MS Ushba, Tugboat needs minor repair jobs especially bowthrustor, painting, renewing of Class and foam liquid for FiFi.
2) MS Metekhi, Tugboat needs minor repair jobs, propeller, renewing of Class and foam liquid for fire fighting.
3) MS Tsiskari, ballast water tankship needs minor repair jobs
4) MS Aisi ballast water tankship needs minor repair jobs
5) MS Fauna, oil pollution fighting ship needs minor repair jobs

Summary Of Rehabilitation Costs of the Port Fleet

Phase I 1998

Name of the vessel	Type of equipment	Rehabilitation costs in USD
MS Ushba	Tugboat	200.000
MS Metekhi	Tugboat	185.000
MS Tsiskari	Ballast tank ship	30.000
MS Aisi	Ballast tank ship	35.000
MS Fauna	Oil pollution fighter	45.000
Subtotal		495.000
10 % Contingency		49.500
Total		**544.500**

3.8.3 Phase III 2008-2012

Unit	Type of equipment	Purchase cost in USD	Total cost in USD
2	Reachstacker	370,000	740,000
4	FLT 2.5t	35,000	140,000
1	Terminal tractor	100,000	100,000
1	Spare parts item 1-3/10%	98,000	98,000
1500	Pallets 2 t Hanse	50	75,000
Subtotal Phase III			**1,153,000**

Depending on the utilisation of the following equipment purchased in Phase I will reach their theoretical end of lifetime and the equipment have to be replaced during Phase III.

The remarks concerning the mobile Harbour crane and the Empty Container handling for Phase II also apply to phase III.

4. Technical Specifications

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 5: Terminal Tractor

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1. General Description

These Specifications describe a Terminal Tractor (4 x 2 drive), which shall be purchased by the Beneficiary as mentioned in the Bill of Quantities, and which shall be used for handling trailers in port operations.

The Terminal Tractor will be particularly used for the handling of 40'-standard truck-type trailers and goose-neck Ro/Ro-type trailers within the terminal.

2. Operation Characteristics

The Terminal Tractor (4 x 2 drive) shall be designed to operate with a minimum tractive effort of 80 kN, and for handling trailers with a load of up to 50,000 kgs.

2.1 Lifting Capacity Requirements

The following requirements of the fifth wheel shall be met:

2.1.1 Fifth Wheel

Fully oscillating fifth wheel capable of lifting an imposed fifth wheel load of 25 tons.

2.1.2

Minimum lowered fifth wheel height: 1,150 mm

2.1.3

Maximum raised fifth wheel height: 2,100 mm

2.1.4

The lift rams shall be heavy-duty double extension, hydraulically operated with two cylinder and equalising control valve for three operating stages, i. e.: raising, holding and lowering.

2.1.5

The fifth-wheel locking device shall be actuated by air pressure for locking and unlocking, operating shall only be possible at stand-still of the Tractor. The locking device shall be of rigid design and easily accessible for maintenance.

2.2 Speed Rates

Maximum speed forward (unladen): 45 km/h

Minimum speed forward (unladen): 30 km/h

2.3 Major Dimensions

2.3.1

Overall length: 5,300 mm

2.3.2

Overall width: 2,500 mm

2.3.3

Maximum turning radius over body: 7,500 mm

2.3.4

Fitting radius, front clearance: 2,200 mm

2.3.5

Fitting radius, rear clearance: 1,600 mm

2.4 Protective Devices

2.4.1

Safety hydraulic lock valves and counterbalance valves shall be provided on the load-bearing hydraulic cylinders.

2.4.2

A King-pin locking device indicator shall be provided.

2.4.3

A beacon light is to be mounted on top of the cabin.

2.4.4 Engine Protection System

An automatic engine shut-off protection system is to be supplied.

2.5 Main Technical and Design Demands

The main frame shall be an all-welded, torsion-resistant frame, with the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect. A rear skid plate to facilitate the picking-up of semi-trailers is to be provided.

The frame structure shall provide efficient protection for all internal parts, especially for the main hydraulic pump. The extra heavy-duty bumpers shall provide protection for the lights. Suitable covers are to ensure anti-slip walk ways.

The Tractor shall be equipped with towing couplers for drawbars in the front and rear.

2.6 Engine

2.6.1 Engine Type

A Diesel Engine with direct fuel injection is required. The engine shall preferably not be turbo-charged. The Bidder shall offer two alternative makes of engines with technical details, type Euro II.

2.6.2 Engine Power

The engine power shall be minimum 115 kW
minimum 135 kW

(rating according to DIN 6271).

2.6.3 Engine-Cooling System

The engine-cooling system shall be designed to work within a temperature range from -20 C to +45 C and a relative humidity of up to 100%.

2.6.4 Engine Air Inlet

The engine air-inlet-system shall be of Donaldson type or equivalent, cyclonic pre-cleaner and double-stage dry paper element type with air-restriction indicator. Air inlets shall be at least 1,600 mm above ground level.

2.6.5 Silencer

Required is a heavy-duty type, mounted in an upswept position.

2.6.6 Engine Oil Filter

Full-flow heavy-duty engine oil filters with a replaceable filter element shall be supplied.

2.6.7 Engine Protection System

An automatic engine shut-off protection system is required, which shall monitor:

- low engine oil pressure
- high engine oil temperature
- high coolant temperature
- high transmission oil temperature

Operation shall be done via a solenoid valve at the injection pump.

2.6.8 Fuel System

Fuel tank capacity: 185 - 200 ltr

Water separator and dual fuel filter with replaceable elements shall be provided.

2.7 Transmission

2.7.1 Transmission Type

A power shift transmission incorporating a torque converter with multiple stages for forward and reverse shall be provided. Testing connections on the gearbox are necessary.

2.7.2 Hydraulic Take-off

The power shift transmission shall drive the hydraulic pumps.

2.7.3 Transmission Oil System

The transmission oil system shall have a separate oil cooler and a full-flow heavy-duty oil filter with a replaceable element. The system shall be designed to work under tropical conditions within a temperature range from -20 C to +45 C.

2.8 Travel Gear

2.8.1 Front Axle

The front axle shall be of heavy-duty type with steel spring suspension assisted by hollow rubber springs, and with a minimum static axle load of 15 t.

It shall be cushioned by hydraulic shock absorbers. Protection rings for the front wheel nuts are to be supplied.

2.8.2 Rear Axle

The rear axle shall be of heavy-duty type double-reduction drive axle, air-suspended with a minimum suspended axle load of 12 t and a minimum static axle load of 20 t without air-suspension.

2.8.3 Tires

Minimum tire size required:: 11.00 x 20 - PR 16 pneumatic type

The tires of the Terminal Tractor and the Terminal Chassis (Item 6) shall be of the same size and have the same PR-rating.

2.9 Brakes

2.9.1 Service Brakes

The service brakes shall be drum/disc brakes, dual circuit air-operated, engine-driven compressor.

The brakes shall be calculated to handle fully-loaded Ro-Ro-trailers which are not equipped with brakes. The brake system must provide connections to standard highway trailers equipped with brakes.

2.9.2 Parking Brake

The parking brake shall be spring-type on rear axles, working independently.

2.10 Steering

Left-hand side in driving direction, fully hydraulic steering of the front axle shall be provided. Steering shall still be possible in case of pump failure.

2.11 Driver's Cabin

2.11.1 Cabin

The driver's cabin shall be of the single-man-type, mounted on anti-vibration rubber mountings. It shall be hydraulically tiltable for easy access to maintain the engine. The cabin shall be equipped with one sliding window installed at the driver's side. The entrance door shall be a sliding door accessible from the back side of the cabin. It is to be provided with sound insulation and shall meet ROPS criteria ISO 3471.

The driver's seat shall be fully suspended according to VDI-regulations 2057. Tinted safety glass windows shall be supplied with windscreen wipers in the front and rear. The required tinted roof window must be secured by metal bars.

2.11.2 Operator's Console

The operator's console shall include all necessary controls for the Tractor's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

The following instruments shall be provided:

- Hourmeter
- Fuel gauge
- Dual air pressure gauge
- Low air pressure warning light and buzzer
- Engine coolant temperature gauge
- Engine oil-pressure warning light and buzzer
- Torque converter oil-temperature gauge
- Torque converter oil-pressure light
- Alternator control lamp
- Parking brake indicator light
- King-pin locking device indicator
- Ammeter charging

The Bidder shall include in its proposal a full list of the devices and their functions on the operator's console and on the auxiliary panel as well as a scheme of this layout.

2.12 Auxiliary Systems

2.12.1 Hydraulic System

The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Full flow, return line, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection. Preferable filter micron rating is 10 microns.

2.12.2 Electrical System

The system's voltage shall be 24 V.

Two batteries of 12 V, of 140 Ah at a 20-hr-rate, maintenance free and suitable for tropical conditions within a temperature range from -20 C to +45 C, shall be fitted in a lockable battery container with a battery main isolating switch.

Lighting:

- Head lights
- Stop/tail lights
- Direction indicator front/rear
- Floodlight mounted to rear of cab to illuminate the coupling

Trailer electrical connection of Type 7 pin SAE is to be provided.

A central fuse box is required, inline fuses are not permitted.

2.12.3 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a paint system according to the manufacturers standard. Preferably it shall be a solvent and heavy-metal free paint (acrylic water-based paint) with not less than four (4) coats of paint:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Paint specifications shall be attached to the tender.

Paint shade to	RAL 2004 Orange
or	RAL 1023 Traffic Yellow

This colour scheme may be altered by the Purchaser.

2.12.3.1 Purchaser's Logo
The Purchaser's logo shall be prominently displayed on the outside of the Terminal Tractor, in positions indicated by the Purchaser. Exterior finishing paints, chlorinated-rubber-based, are to be used.

2.13 Design Criteria

2.13.1 General Design

The general design, the stability design and the mechanical design of the Terminal Tractor shall conform to recognised international standards. The Bidder shall explicitly state the standards used in its design.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility.

2.13.2 Lubrication

Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for planetary drive and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. The lubricants shall be of types and makes available in the Beneficiary's country.

2.13.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors should be introduced into the tractor's design, whenever practical.

2.13.4 Diagnostic Techniques

Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of system's down time. The Bidder shall list in its proposal systems for which such diagnostic procedures will be supplied.

2.13.5 Electrical Design

2.13.5.1 General

All electrical equipment, materials and workmanship shall conform to the applicable current standards of VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 50 degrees centigrade of ambient temperature. Nameplates shall be of engraved phenolic plastic, attached to the equipment with corrosion-resistant screws.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.13.5.2 Wiring

Electrical wiring throughout the tractor shall be dimensioned in accordance with the circuit's current-carrying requirements. The cables shall be rigidly and securely saddled to the Tractor structure and shall be protected along their full length by removable covers.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimise vibration damage.

2.13.6 Quality Control

The Contractor shall be responsible for inspection methods, maintaining surveillance and control over all testing and special processes, checking manufacturing methods, materials and bought-in supplied items, for compliance with the applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspections reports shall be furnished for:

(a) Engine
(b) Transmission
(c) Hydraulic pumps and cylinders
(d) Steel used in load-bearing structural frame members
(e) Brakes
(f) Welders' certifications
(g) Safety devices
(h) Fifth wheel assembly.

The Purchaser shall submit a certificate of his quality control system according to ISO 9000 - 9004.

2.14 Final Adjustment and Testing

The Contractor shall submit to the Purchaser for approval the full testing programme, including the contents of tests, methods of conducting, control and measuring, required instruments, equipment and power.

The Purchaser will provide the equipment operator and the necessary loads.

Final testing process shall consist of the following main stages:

(a) Dynamic test
(b) Testing of safety devices
(c) Testing of speeds
(d) Operations test

2.15 Safety Arrangements

General assembly and detail design of the Tractor shall conform to the safety regulations and codes listed in the Contract, added by the following:

2.15.1

All nuts connecting the moving and rotating parts (couplings, drums, sheaves, etc.) shall be of the self-locking type to prevent their loosening due to vibration.

2.15.2

All rotating parts shall be provided with rigid safety guards.

2.15.3

The Contractor shall install one (1) 2-kg powder fire extinguisher in the cab.

2.15.4

Unavoidable hazardous points shall be marked with a special warning paint (yellow and black stripes).

2.16 General Instructions

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.

The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

A detailed load calculation must be provided with the maximum pay load (40 t) of the terminal chassis for the following components of the tractor:

(1) Load distribution between the front and rear axle
(2) Front axle at 25 km/h
(3) Rear axle at 25 km/h
(4) Tires at 25 km/h
(5) Rims at 25 km/h

3. Spare Parts And Special Tools

3.1 Purchaser's Required Spare Parts Lists

The Bidder shall submit with its bid the following list of required spare parts, duly completed and priced:

Group 1: Cylinder Block and Head
Group 2: Injection System
Group 3: Cooling System and Oil Cooler
Group 4: Air Lines and Turbocharger
Group 5: Electrical System
Group 6: Torque Converter and Transmission
Group 7: Drive Shaft and Differential
Group 8: Steering and Brake System
Group 9: Hydraulic Systems
Group 10: Frame and Cabin
Group 11: Fifth Wheel

Price basis shall be "Ex Works".

3.1.1 Group 1: Cylinder Block and Head

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Liner, cylinder		
2	1	pc	Crankshaft assy		
3	1	pc	Main bearing, crankshaft		
4	1	pc	Cylinder head assy		
5	1	pc	Exhaust valve		
6	1	pc	Inlet valve		
7	1	pc	Cylinder head gasket		
8	1	pc	Oil filter element		
9	1	pc	Oil pump		
10	1	pc	Cylinder ring set		
11	1	pc	Gasket set, overhauling		
12	1	pc	Engine complete, new		
Total Price, ex works					

3.1.2 Group 2: Injection System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Fuel filter elements		
2	1	pc	Fuel pump assy		
3	1	pc	Injection pump assy		
Total Price, ex works					

3.1.3 Group 3: Cooling System and Oil Cooler

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	V-belt set		
2	1	pc	Radiator		
3	1	pc	Oil cooler		
4	1	pc	Water pump assy		
Total Price, ex works					

3.1.4 Group 4: Air Lines and Turbocharger

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Turbocharger, assy		
2	1	pc	Air filter, element		
3	1	pc	Exhaust muffler		
4	1	pc	Exhaust tube, assy		
Total Price, ex works					

3.1.5 Group 5: Electrical System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Battery		
2	1	pc	V-belt set		
3	1	pc	Alternator		
4	1	pc	Starter		
5	1	pc	Lamp assy, front		
6	1	pc	Horn		
7	1	pc	Lamp assy, rear		
Total Price, ex works					

3.1.6 Group 6: Torque Converter and Transmission

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Oil filter element		
2	1	pc	Oil filter assy		
3	1	pc	Clutch group		
4	1	pc	Control valve		
5	1	pc	Transmission, group		
Total Price, ex works					

3.1.7 Group 7: Drive Shaft and Differential

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Gasket kit differential assy		
2	1	pc	Oil seal ring differential assy		
3	1	pc	Bearing set differential assy		
4	1	pc	Joint cardan		
5	1	pc	Oil seal ring, drive axle front		
6	1	pc	Bearing set, drive axle front		
7	1	pc	Tyre, front		
8	1	pc	Tyre, rear		
Total Price, ex works					

3.1.8 Group 8: Steering and Brake System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Steering cylinder assy		
2	1	pc	Bearing set		
3	1	pc	Brake disc		
4	1	set	Brake pad		
5	1	pc	Pump, assy		
6	1	pc	Repair kit, pump assy		
7	1	pc	Brake master cylinder		
Total Price, ex works					

3.1.9 Group 9: Hydraulic Systems

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Hydraulic pump assy		
2	1	pc	Repair kit, hydraulic pump		
3	1	pc	Control valve, hydraulic pump		
4	1	pc	Hydraulic filter elements		
5	1	pc	Lift cylinder, assy		
Total Price, ex works					

3.1.10 Group 10: Frame and Cabin

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Windscreen, front		
2	1	pc	Windscreen, rear		
3	1	pc	Windscreen, side		
4	1	pc	Windscreen wiper		
5	1	pc	Mirror outside		
6	1	pc	Driver's seat, complete		
Total Price, ex works					

3.1.11 Group 11: Fifth Wheel

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Fifth wheel plate		
2	1	pc	Lift boom, assy		
3	1	pc	Locking cylinder		
4	1	pc	Control valve, locking cylinder		
5	1	pc	Locking device		
6	1	pc	Limit switch		
7	1	pc	Bowden cable, control valve		
Total Price, ex works					

3.2 Bidder's Recommended Spare Parts and Special Tools Lists

The Bidder shall prepare and submit to the Purchaser recommended and priced spare parts lists for a period of operation of 3,000 hours.

The spare parts lists should include the following data elements:

- Sequence number
- Bidder's part number
- Item description
- Figure and item number in the illustrated parts breakdown/drawing if applicable
- Quantity
- Unit price
- Total price

The Bidder shall prepare and submit to the Purchaser recommended and priced special tools which are required but not included in the delivery.

4. Bill of Quantities

Item	Description	Unit	Qty	Unit Cost	Total Cost
3	Terminal Tractor	pc	1		
3.1	Purchaser's Required Spare Parts	set	1		
Total, FOB					
Sea freight to Batumi					
Insurance to Batumi					
Total, CIF Batumi					

Delivery Period to the Port of Batumi ..... weeks

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 6: 38-t/40' Terminal Chassis

Table of Contents

1. General Description

These Specifications describe a 40'/38-t Terminal Chassis which will be purchased by the Beneficiary as mentioned in the Bill of Quantities, and which shall be used for supplementing crane and container operation, handling of 2 x 20' and 1 x 40' ISO containers.

2. Operations Characteristics

2.1 Capacity Requirements

The terminal chassis shall be designed to operate with the following capacities:

- 38 t pay-load at a travelling speed of 25 km/h
- 2 x 20' ISO containers
- 1 x 40' ISO container
- King pin load with maximum pay load, less than 25 tons

2.2 Travelling Speed

The travelling speed of the terminal chassis shall be:

- fully loaded/maximum pay load:	not less than	25 km/h
- unladen:	not less than	30 km/h
	not more than	45 km/h

2.3 Dimensions

Overall length:	not more than	12,500 mm
Overall width:	not more than	2,700 mm
Chassis bed height:	not more than	1,450 mm
Bed length:	not more than	12,200 mm
Height of sliding plate:	1,150 mm - 1,250 mm	
Front fitting radius:	not more than	1,700 mm
Rear fitting radius:	1,800 - 1,900 mm	
Rear overhang	not more than:	3,000 mm
King pin SAE:	2 inches	

2.4 Main Technical and Design Demands

2.4.1 Main Frame Construction

The main frame shall be an all welded, torsion resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect. A fifth-wheel sliding plate shall be solidly connected to the chassis frame.

The chassis shall be equipped with a telescopic or foldable landing gear with a minimum static capacity of 30 t.

2.4.2 Axles and Wheels

Two (2) heavy-duty fabricated, leaf-spring suspended axles shall be assembled. Each axle shall be provided with four (4) heavy duty pneumatic tired wheels.

2.4.3 Tires

Minimum tire size required: 11.00 x 20 - PR 16, pneumatic type

The tires of the Terminal Chassis and the Terminal Tractor (Item 5) shall be of the same size and have the same PR-rating.

2.5 Special Arrangements

The Terminal Chassis shall be equipped with

- four fixed corner guides including fixed pins and
- two container guides in the centre

and allow opening of container doors at the rear for loading and unloading.

2.6 Surface Protection

All structural parts shall be blasted to DIN 55928, SA 2.5 standard and painted with a paint system that will include four (4) paint layers:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 140 microns.

Paint system according to the manufacturer's standard, preferably it shall be a solvent and heavy-metal-free paint (acrylic water-based paint). Paint specifications shall be attached to the tender.

Paint: Shade to RAL 2004 Orange or RAL 1023 Traffic Yellow

This colour scheme may be altered on demand of the Purchaser.

2.7 Design Criteria

2.7.1 Lubrication

Lubrication of mechanical parts shall be by means of high pressure grease introduced through industrial button-type fittings.

2.7.2 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors shall be introduced into the chassis' design, whenever practical.

2.7.3 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and controls over all testing and special processes, checking manufacturing methods, materials and bought-in items, for compliance with applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspection reports shall be furnished for:

(a) steel used in load bearing structural frame members
(b) welder's certifications
(c) axles

The Purchaser shall submit a certificate of his quality control system according to ISO 9000 - 9004.

2.8 Final Adjustment and Testing

After the chassis has been adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformance to all requirements defined in these Specifications.

The Contractor shall provide the operator and the necessary loads.

Final testing process shall consist of such main stages:

(a) static test
(b) testing of speeds
(c) running test

2.9 Safety Arrangements

General assembling and detailed design of the chassis shall conform to the safety regulations and codes listed in the Special Conditions of Contract with the addition of the following:

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

Unavoidable hazardous points shall be marked with a special warning paint (yellow and black stripes).

Reflectors shall be mounted on the chassis as follows:

- four (4) on each side (yellow)
- two (2) triangles on the rear (red)
- two (2) on the front (yellow)

A rear protection cross bar at a height of 500 mm above the ground shall be installed.

2.10 General Instructions

The Bidder shall submit with its proposal detailed specifications and main and transverse beams strength calculations.

Detailed load calculation must be provided with maximum pay load for:

(1) King pin load
(2) Landing legs
(3) Axles at 25 km/h
(4) Tires at 25 km/h
(5) Rims at 25 km/h

All terminal chassis shall be from one production lot.

3. Data Sheet

The Bidder shall enclose with its proposal the following filled-out data sheet:

3.1	Manufacturer	_____	
3.2	Model	_____	
3.3	Loads		
3.3.1	Dead weight	_____	kg
3.3.2	Maximum pay load	_____	kg
3.3.3	Total weight	_____	kg
3.3.4	King pin load with maximum pay load	_____	kg
3.4	Travelling Speed		
3.4.1	Laden with maximum pay load	_____	km/h
3.4.2	Unladen	_____	km/h
3.5	Dimensions		
3.5.1	Overall length	_____	mm
3.5.2	Overall width	_____	mm
3.5.3	Bed length	_____	mm
3.5.4	Bed height	_____	mm
3.5.5	King pin size	_____	inch
3.5.6	Front tilting radius	_____	mm
3.5.7	Rear tilting radius	_____	mm
3.5.8	Rear overhang	_____	mm
3.5.9	Height of sliding plate	_____	mm
3.6	Construction		
3.6.1	Main beam shape and size	_____	
3.6.2	Main beam steel strength	_____	N/mml
3.6.3	Side beam shape and size	_____	
3.6.4	Side beam steel strength	_____	N/mml

3.6.5	Transverse beam shape and size		
3.6.6	Transverse beam steel strength		N/mml
3.6.7	Quantity of transverse beams		
3.7	Axles		
3.7.1	Manufacturer		
3.7.2	Model		
3.7.3	Rated load at 25 km/h		kg
3.7.4	Total axle load at 25 km/h		kg
3.8	Tires		
3.8.1	Manufacturer		
3.8.2	Size		
3.8.3	Rated load at 25 km/h		kg
3.8.4	Total tire load at 25 km/h		kg
3.8.5	Ground pressure		kp/cml
3.9	Landing Legs		
3.9.1	Manufacturer		
3.9.2	Type		
3.9.3	Capacity per leg		kg

4. Spare Parts and Special Tools

The Bidder shall prepare and submit to the Purchaser recommended and priced spare parts lists for a period of operation of 3,000 hours.

The spare parts list shall include one complete axle with wheels and tires.

The spare parts lists shall include the following data elements:

- sequence number
- Bidder's part number
- item description
- figure and item number in the illustrated parts breakdown/drawing if applicable
- quantity
- unit price
- total price

The Bidder shall prepare and submit to the Purchaser recommended and priced tools which are required but not included in the delivery.

5. Bill of Quantities

Item	Description	Unit	Qty	Unit Cost	Total Cost
	38-t/40' Terminal Chassis	pc	4		
Sea freight to Batumi					
Insurance to Batumi					
Total, CIF Batumi					

Delivery Period to the Port of Batumi ..... weeks

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 7: 40'/60-t Roll Trailer

Table of Contents

1. General Description

These Specifications describe a 40'/60-t Roll Trailer which will be purchased by the Beneficiary, and which shall be used for supplementing crane and container operation, handling of 2 x 20' and 1 x 40' ISO containers, bulk and general cargo.

2. Operations Characteristics

2.1 Capacity Requirements

The roll trailer shall be designed to operate with the following capacities:

- pay load of 60 t general cargo at a speed of 10 km/h
- 2 x 20' ISO containers
- 1 x 40' ISO container

2.2 Travelling Speed

The travelling speed of the roll trailer shall be:

- fully loaded, 60 t:	not less than	10 km/h
- unloaded:	not less than	25 km/h

2.3 Dimensions

Overall length:	not more than	12,600 mm
Overall width:	not more than	2,800 mm
Trailer bed height:	not more than	1,100 mm
Bed length:	not more than	12,300 mm
Rear overhang	not more than:	3,000 mm

2.4 Main Technical and Design Demands

2.4.1 Main Frame Construction

The main frame shall be an all welded, torsion resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The trailer shall have a coupling mouth for detachable goose-necks with safety hooks beside the mouth.

The maximum King pin load shall not exceed 22 t at maximum pay load.

2.4.2 Axles and Wheels

Two (2) heavy-duty fabricated longitudinal rocker beams with four (4) fully-oscillating axle sets shall be assembled one to each end of each rocker beam. Each axle shall be provided with two (2) heavy-duty super-elastic wheels.

2.4.3 Tires

Minimum tire size required: 350 - 15 super-elastic

2.4.4 Brakes

Brakes are not required.

2.4.5 Bed Surface Covering

The bed surface covering shall be of treated selected pinewood, with spaced chamfered timbers fixed to the beams to allow the drainage of water.

2.5 Special Arrangements

The 40'/60 t roll trailer shall be equipped with

- heavy-angled retractable corner guides with fixed centring pins
- retractable middle guides for ISO container location
- combined cargo and deck lashings (6 on each side)

2.6 Surface Protection

All structural parts shall be blasted to DIN 55928, SA 2.5 standard and painted with a paint system according to the manufacturer's standard that will include four (4) paint layers:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Shade to RAL 2009 Traffic Orange or RAL 1023 Traffic Yellow

This colour scheme may be altered on demand of the Purchaser.

2.7 Design Criteria

2.7.1 Lubrication

Lubrication of mechanical parts shall be by means of high pressure grease introduced through industrial button-type fittings.

2.7.2 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors shall be introduced into the trailer's design, whenever practical.

2.7.3 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and controls over all testing and special processes, checking manufacturing methods, materials and bought-in items, for compliance with applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspection reports shall be furnished for:

(a) steel used in load bearing structural frame members
(b) welder's certifications
(c) bed surface cover (timber treatment)

2.8 Final Adjustment and Testing

After the trailer has been adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformance to all requirements defined in these Specifications.

The Contractor shall provide the operator and the necessary loads.

Final testing process shall consist of such main stages:

(a) static test
(b) testing of speeds
(c) running test

2.9 Safety Arrangements

2.9.1

General assembling and detailed design of the trailer shall conform to the safety regulations and codes listed in the Special Conditions of Contract with the addition of the following:

2.9.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.9.3

Unavoidable hazardous points shall be marked with a special warning paint (yellow and black stripes).

2.9.4

- Reflectors shall be mounted on the trailer, well protected in the steel construction:
- four (4) on each side (yellow)
- two (2) in the rear (red)
- two (2) in the front (yellow)

2.10 General Instructions

The Bidder shall submit with its proposal detailed specifications and main and transverse beams strength calculations.

All roll trailers shall be from one production lot.

3. Data Sheet

The Bidder shall enclose with its proposal the following filled-out data sheet:

3.1	Manufacturer`	_____	
3.2	Model		
3.3	Loads		
3.3.1	Dead weight	_____	kg
3.3.2	Maximum load at 10 km/h	_____	kg
3.3.3	Maximum rated fifth-wheel load	_____	kg
3.4	Travelling Speed		
3.4.1	Laden	_____	km/h
3.4.2	Unladen	_____	km/h
3.5	Dimensions		
3.5.1	Overall length	_____	mm
3.5.2	Overall width	_____	mm
3.5.3	Bed length	_____	mm
3.5.4	Bed height	_____	mm
3.6	Construction		
3.6.1	Main beam shape and size	_____	

3.6.2	Main beam steel strength		N/mml
3.6.3	Side beam shape and size		
3.6.4	Side beam steel strength		N/mml
3.6.5	Transverse beam shape and size		
3.6.6	Transverse beam steel strength		N/mml
3.6.7	Quantity of transverse beams		
3.7	Axles		
3.7.1	Manufacturer		
3.7.2	Model		
3.7.3	Rated load at 10 km/h		kg
3.7.4	Total rated axle load		kg
3.8	Tires		
3.8.1	Manufacturer		
3.8.2	Size		
3.8.3	Rated load at 10 km/h per tire		kg
3.8.4	Rated load at 10 km/h - all tires		kg
3.8.5	Ground pressure		kp/cml

3.9 Bed Surface Cover Description

4. Spare Parts And Special Tools

The Bidder shall prepare and submit to the Purchaser recommended and priced spare parts lists for a period of operation of 3,000 hours.

The spare parts list shall include one complete axle with wheels and tires.

The spare parts lists shall include the following data elements:

- sequence number
- Bidder's part number
- item description
- figure and item number in the illustrated parts breakdown/drawing if applicable
- quantity
- unit price
- total price

The Bidder shall prepare and submit to the Purchaser recommended and priced tools which are required but not included in the delivery.

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 8: Goose-Neck

Table of Contents

1. General Description

These Specifications describe a Goose-Neck which will be purchased by the Beneficiary and which shall be attached to the Terminal Tractor (Item 5) to handle the 40'/60-t Roll Trailer (Item 7).

2. Operations Characteristics

2.1

The Goose-Neck shall be designed to operate with the following capacities:

- Minimum lifting capacity/King pin load: 30 tons
- King pin size: 2"

2.2

The front and rear turning radius must correspond to those of the Terminal Tractor and the Roll Trailer (Items 5 and 7).

2.3

A parking stand must be provided for each Goose-Neck.

2.4

Safety hooks on the Goose-Neck must be provided for the coupling mouth.

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 9: 10-t Forklift Truck

Table of Contents

1. General Description

These specifications describe a 10-t forklift truck which shall be purchased by the Beneficiary and which shall be used for general cargo handling.

2. Operating Characteristics

2.1 Operations Characteristics

(see Data Sheet, Clause 3, for abbreviations)

2.1.1 Lifting Capacity

2.1.1.1
Basic capacity with side-shifting fork positioning carriage shall be at a load centre of 1,200 mm 10,000 kg

2.1.1.2
Lifting Height, minimum 4,500 mm

2.1.1.3
Mast Construction shall be of the double-stage free-view type.

2.1.1.4 Tilt Angles

- Forward 5 degrees
- Backward 10 degrees

2.1.2 Speeds

2.1.2.1
Driving Speed Forward 25 km/h - 30 km/h

2.1.2.2
Driving Speed Backward 25 km/h - 30 km/h

2.1.2.3
Lifting with load 0.25 m/s - 0.30 m/s

2.1.2.4
Lifting without load 0.30 m/s - 0.35 m/s

2.1.2.5
Lowering with load 0.30 m/s - 0.35 m/s

2.1.2.6
Lowering without load 0.25 m/s - 0.30 m/s

2.1.3 Major Dimensions

2.1.3.1
Overall length L1 + L2 including forks, maximum 8,000 mm

2.1.3.2
Overall width B, maximum 2,500 mm

2.1.3.3
Height, mast lowered h1, maximum (container loader) 3,000 mm

2.1.3.4
Turning radius WA, maximum 5,000 mm

2.1.3.5
Ast 4, maximum 8,500 mm

2.1.4 Protective Devices

2.1.4.1
Safety hydraulic lock valves shall be provided on all load-bearing hydraulic cylinders (tilting and lifting).

2.1.4.2
Hydraulic counterbalance valves shall be provided on load-lowering motions.

2.1.4.3
A beacon light shall be mounted on top of the cabin.

2.2 Main Technical and Design Demands

2.2.1 Main Frame Construction

The main frame shall be an all-welded, torsion-resistant frame, utilizing the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect.

The frame structure shall provide efficient protection for all internal parts, especially for the battery storage and the hydraulic oil tanks.

2.2.2 Power Plant

2.2.2.1
A Diesel Engine with direct fuel injection shall be provided. Preferably, the engine shall not be turbo-charged. The Bidder shall offer two alternative makes of engines with full technical details.

2.2.2.2 Engine Power
The engine power shall be minimum 100 kW
maximum 120 kW

2.2.2.3 Engine-Cooling System
The engine-cooling system shall be designed to work in a tropical climate.

2.2.2.4 Engine Air Inlet
The engine air inlet system shall be of Donaldson type or equivalent, cyclonic pre-cleaner and double-stage-dry paper element type with air-restriction indicator. Air inlets shall be at least 2000 mm above ground level.

2.2.2.5 Silencer
Required is a heavy-duty type, mounted in an upswept position.

2.2.2.6 Engine Oil Filter
Full-flow heavy-duty engine oil filters with a replaceable filter element shall be supplied.

2.2.2.7 Engine Protection System
An automatic engine shut-off protection system shall be provided:

The system shall monitor:
- low engine oil pressure
- high engine oil pressure
- high coolant temperature
- high transmission oil temperature

2.2.2.8 Fuel Systems
Fuel tank capacity shall be 120 - 150 litres. Water separator and dual fuel filter with replaceable elements shall be provided.

2.2.3 Transmission

2.2.3.1
A power shift transmission incorporating a torque converter, with multiple stages for forward and reverse, shall be provided. Pressure-testing connections on the gearbox and power take-offs for the hydraulic pump shall be provided.

2.2.3.2 Transmission Oil System
The transmission oil system shall have a separate oil cooler and a full-flow heavy-duty oil filter with a replaceable element. The system shall be capable of tropical zone operations with a temperature range of - 20 °- +45 °C and 100% humidity.

2.2.4 Travel Gear

2.2.4.1 Drive Axle

The drive axle shall be fixed and be of heavy-duty type with planetary axle and hub reduction.

2.2.4.2 Steering Axle

The power steering axle shall be of heavy-duty type with a single double-acting hydraulic cylinder.

2.2.4.3 Tires

Tires shall be of pneumatic type. The twin tires on the drive axle and the two tires on the steering axle shall be of the same size.

Size: Front 12.00 x 20 - 18 PR
Rear 12.00 x 20 - 18 PR

All tires shall be filled up with tirefill.

2.2.5 Brakes

2.2.5.1 Service Brakes

The service brakes shall either be two hydraulically-operated disk brakes or wet disc brakes.

2.2.5.2 Parking Brake

The parking brake shall be spring-actuated and mechanically operated.

2.2.6 Hydraulic System

2.2.6.1

The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Independent lines shall be provided for

- steering
- piloting
- lifting
- tilting
- side-shifting
- swivelling

2.2.6.2

The hydraulic system shall be protected against pump failures due to contamination by high-pressure cartridge-type filters fitted on the delivery lines.

In addition, in the return line, full flow, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection and a clogged condition indicator. The preferable filter micron rating shall be 10 microns.

2.2.6.3
A full flow fin and tube-type, oil to air hydraulic fluid cooler shall be provided in the hydraulic system to maintain safe operating temperatures.

2.2.6.4
The hydraulic oil tank drain plug shall be of magnetic type.

2.2.6.5
The main valve of the mast-lowering brake shall be installed in or directly mounted to the lifting cylinder.

2.2.6.6
Quickly-detachable hose couplings for spreader operation shall be provided on the truck.

2.2.7 Driver's Cabin

A cabin for increased visibility and improved safety and productivity shall be offered.

The driver's cabin shall be of the single-man-type, mounted on anti-vibration rubber mountings. Doorlocks (keys) on all lift trucks shall be provided. The cabin shall be provided with sound insulation. Driver's seat shall be fully suspended. The left and right hand cabin windows shall be installed in a way that opening for ventilation is possible. Tinted safety glass for all windows shall be provided with windscreen wipers fitted at the front and at the rear window.

The cabin shall meet FOPS criteria ISO 3449 and FEM.

A heating system shall be installed.

2.2.7.1 Operator's Console

The operator's console shall include all necessary controls for the Forklift Truck's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

The following instruments shall be provided:

- Hourmeter
- Fuel gauge
- Engine coolant temperature gauge
- Engine oil pressure warning light and buzzer
- Torque converter oil-temperature gauge
- Torque converter oil-pressure light
- Alternator control lamp
- Dual air pressure gauge, if applicable
- Parking brake indicator light
- Twistlocks indicator lights
- Ammeter charging

2.2.8 Electrical System

The systems voltage shall be 24 V.

Two batteries of 12 V, alt least 130 Ah at 20-hr-rate, maintenance free and with a battery main isolating switch shall be supplied. The battery compartment must be lockable.

Lighting:
- Head lights, well protected
- Stop/tail lights, well protected
- Direction indicator front rear, well protected
- Floodlight mounted to rear of cab
- Four working lights on the mast

A central fuse box is required, inline fuses are not permitted.

2.2.9 Fork Attachment

The forklift truck shall be equipped with a side-shifting fork positioner and standard forks of 2,200 mm in length.

2.2.10 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a high-built paint system according to the manufacturers standard preferably it shall be a solvent and heavy-metal-free paint (acrylic water-based paint) with not less than four (4) coats of paint:

- paint specifications shall be attached to the tender
- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 180 microns.

Paint	Shade to	RAL 2009 Traffic Orange
	or	RAL 1023 Traffic Yellow

Mast, carriage and forks RAL 9005 Flat Black.

Danger stripes in black paint across the counter-weight are required.

This colour scheme may be altered by the Purchaser.

2.2.10.1 Purchaser's Logo

The Purchaser's logo shall be prominently displayed on the outside of the truck in positions indicated by the Purchaser. Exterior finishing paints, according to manufacturers standard, shall be used.

2.3 Design Criteria

2.3.1 General Design

The general design and the stability design of the forklift truck shall conform to the requirements of

- DIN 15138
- FEM Section III
- ISO
- BS 5750 Part 1.

The Bidder shall state the standards used in its design.

2.3.2 Mechanical Design

2.3.2.1 General
The mechanical design of load-carrying parts shall be calculated to FEM Section III A, DIN 15173. Any pinch and shear points on the upright and carriage shall be avoided.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility for lubrication, inspection and maintenance.

2.3.2.2 Bearings
Bearings on the forklift truck shall be of the anti-friction type.

2.3.2.3 Lubrication
Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for speed reducer and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. All pedal shafts, steering axles and lift cylinder mountings shall be greasable. The oil for lubrication shall be of the type and make as used in Georgia.

2.3.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors should be introduced into the forklift truck's design, whenever practical.

2.3.3.1
Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of systems down time. The Bidder shall list in its proposal systems for which such diagnostic procedures will be supplied.

2.3.3.2 Accessibility

Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the hardware and its layout in the forklift truck shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

2.3.4 Electrical Design

2.3.4.1 General

All electrical equipment, materials and workmanship shall conform to the applicable current standards of BS, ASA, VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 40 degrees centigrade of ambient temperature. Nameplates shall be engraved on phenolic plastic, attached to the equipment with corrosion-resistant rivets.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.3.4.2 Wiring

Electrical wiring throughout the forklift truck shall be dimensioned in accordance with the circuit's current-carrying requirements.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimize vibration damage.

2.3.5 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high-quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and control over all testing and special processes, checking manufacturing methods, materials and bought-in supplied items, for compliance with the applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspections reports shall be furnished for:

(a) Engine
(b) Transmission
(c) Hydraulic pumps and cylinders
(d) Steel used in load bearing structural frame members
(e) Brakes
(f) Welders' certifications
(g) Safety devices
(h) Forks
(i) Chain certificate
(j) Capacity certificate

The Purchaser shall submit a certificate of his quality control system according to ISO 9000-9004.

2.4 Final Adjustment and Testing

After the forklift truck has been erected, adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformity to all requirements defined in these Specifications.

The Contractor shall submit to the Purchaser for approval the full testing program, including the contents of tests, methods of conducting, control and measuring, required instruments, equipment and power.

The Purchaser will provide the operator and the necessary loads.

Final testing process shall consist of the following main stages:

(a) Static test
(b) Dynamic test
(c) Testing of safety devices
(d) Testing of speeds
(e) Operations test

These tests shall prove that all indicated data are in conformity with the Contractor's specifications.

2.5 Safety Arrangements

2.5.1

General assembly and detail design of the forklift truck shall conform to the safety regulations and codes listed in the Special Conditions of Contract added by the following:

2.5.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.5.3

All rotating parts shall be provided with rigid safety guards.

2.5.4

The Contractor shall install one (1) 3-kg powder fire extinguisher in the cab.

2.5.5

Unavoidable hazardous points shall be marked with a special warning paint (yellow/orange and black stripes).

2.5.6

Walk ways shall be covered with anti-slip coat.

2.5.7

Automatic reversing lights with acoustic warning signal.

2.6 General Instructions

2.6.1 Bidder-Supplied Information

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.

The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

3. Data Sheet

3.1

The Bidder shall enclose with its proposal the following data sheet according to DIN 15140 specification.

3.2

Additionally, the following shall be provided with the data sheet:

3.2.1

Data sheets on all main components such as engine, transmission and hydraulic components.

3.2.2

Dimensional drawing of the forklift truck.

3.2.3

Load diagram for standard fork operations.

3.2.4

Statement-indicating maximum ground pressure.

3.2.5

Paint specification

1. General Description

These Specifications describe a 2.5-t-Forklift-Truck which shall be purchased by the Beneficiary as mentioned in the Bill of Quantities, and which shall be used for cotton handling inside the warehouse.

2. Operating Characteristics

2.1 Operations Characteristics

2.1.1 Lifting Capacity

2.1.1.1 Basic capacity with side-shifting fork positioning carriage at load centre of 500 mm shall be:	2,500 kg
2.1.1.2 Residual capacity at the required lifting height of 3,000 mm at a load centre of 800 mm shall be:	2,000 kg
2.1.1.3 Lifting height with standard drop forks, minimum	6,000 mm
2.1.1.4 Mast construction shall be of the free-view-type, triplex, full free lift, minimum	1,300 mm
2.1.1.5 Tilt Angles	
Forward	6 degrees
Backward	12 degrees
2.1.1.6 Forks	
Standard forks, length	1,100 mm

2.1.2 Speeds

2.1.2.1 Driving speed forward	25 km/h - 30 km/h
2.1.2.2 Driving speed backward	25 km/h - 30 km/h
2.1.2.3 Lifting with load	0.45 m/s - 0.50 m/s
2.1.2.4 Lifting without load	0.50 m/s - 0.60 m/s
2.1.2.5 Lowering with load	0.40 m/s - 0.55 m/s
2.1.2.6 Lowering without load	0.40 m/s - 0.50 m/s

2.1.3 Major Dimensions

2.1.3.1	Overall length L1 + L2 incl. forks, maximum	4,000 mm
2.1.3.2	Overall width B, maximum	1,900 mm
2.1.3.3	Height, mast lowered h1, maximum	2,800 mm
2.1.3.4	Turning radius WA, maximum	3,100 mm
2.1.3.5	Ast 4, maximum	4,500 mm

2.1.4 Protective Devices

2.1.4.1
Safety hydraulic lock valves shall be provided on all load-bearing hydraulic cylinders (tilting and lifting).

2.1.4.2
Hydraulic counterbalance valves shall be provided on load-lowering motions.

2.2 Main Technical and Design Demands

2.2.1 Main Frame Construction

The main frame shall be an all-welded, torsion-resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect.

The frame structure shall provide efficient protection for all internal parts, especially for the fuel and hydraulic oil tanks.

Sling eyes shall be provided on the frame structure and counterweight to enable the lifting of the truck by crane. The counterweight is to be quickly detachable.

The Bidder shall indicate the length of the lifting ropes required.

2.2.2 Power Plant

2.2.2.1
A Diesel Engine with direct fuel injection shall be provided. Preferably, the engine shall not be turbo-charged. The Bidder shall offer two alternative makes of engines with full technical details, type Euro II.

2.2.2.2
The engine power shall be minimum 35 kW

maximum 50 kW
(rating according to DIN 6271).

2.2.2.3 Engine-Cooling System
The engine-cooling system shall be designed to work in a tropical climate.

2.2.2.4 Engine Air Inlet
The engine air inlet system shall be of Donaldson type or equivalent, cyclonic pre-cleaner and double-stage dry paper element type with air-restriction indicator.

2.2.2.5 Silencer
Required is a heavy-duty type, mounted in an upswept position.

2.2.2.6 Engine Oil Filter
Full-flow heavy-duty engine oil filters with a replaceable filter element shall be supplied.

2.2.2.7 Engine Protection System
An automatic engine shut-off protection system, which shall be electrically operated via solenoid valve at the injection pump, shall be provided.
The system shall monitor:

- low engine oil pressure
- high engine oil temperature
- high coolant temperature
- high transmission oil temperature

2.2.2.8 Fuel System
Fuel tank capacity shall be 40 - 60 litres. Water separator and dual fuel filter with replaceable elements shall be provided.

2.2.3 Transmission

2.2.3.1
A power shift transmission incorporating a torque converter, with multiple stages for forward and reverse, shall be provided. Pressure-testing connections on the gearbox and power take-offs for the hydraulic pump shall be provided.

2.2.3.2 Transmission Oil System
The transmission oil system shall have a separate oil cooler and a full-flow heavy-duty oil filter with a replaceable element. The system shall be capable of tropical zone operations.

2.2.4 Travel Gear

2.2.4.1 Drive Axle
The drive axle shall be fixed and be of heavy-duty type with planetary axle and hub reduction.

2.2.4.2 Steering Axle
The steering axle shall be of heavy-duty type with one hydraulic cylinder.

2.2.4.3 Tyres

Tyres shall be of superelastic type. The two tyres on the drive axle and the two tyres on the steering axle shall preferably be of the same size. The Bidder shall offer alternative sizes of tyres to reach the maximum reduction of the front axle load.

2.2.5 Brakes

2.2.5.1 Service Brakes

The service brakes shall either be two hydraulically-operated disk or drum brakes on the drive axle.

2.2.5.2 Parking Brake

The parking brake shall be spring-actuated and mechanically operated.

2.2.6 Hydraulic System

2.2.6.1

The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Independent lines shall be provided for
- steering
- piloting
- lifting
- tilting
- side-shifting

2.2.6.2

The hydraulic system shall be protected against pump failures due to contamination by high-pressure cartridge-type filters fitted on the delivery lines.
In addition, in the return line, full flow, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection and a clogged condition indicator. The preferable filter micron rating shall be 10 microns.

2.2.6.3

A full flow fin and tube-type, oil to air hydraulic fluid cooler shall be provided in the hydraulic system to maintain safe operating temperatures.

2.2.6.4

The hydraulic oil tank drain plug shall be of magnetic type.

2.2.6.5

The main valve of the mast-lowering brake shall be installed in or directly mounted to the lifting cylinder.

2.2.6.6

The truck shall be equipped with a 4-way hydraulic valve.

2.2.6.7

Quick detachable hose couplings for attachments shall be provided on the truck.

2.2.7 Operator's Compartment and Overhead Guard

The driver's seat shall be of the full suspension type. Compartment and overhead guard shall meet FOPS criteria ISO 3449 and FEM.

The driver's overhead guard shall be covered with a suitable transparent plastic, fastened in a noise-reducing manner.

2.2.7.1 Operator's Console

The operator's console shall include all necessary controls for the Forklift's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

The following instruments shall be provided:

- Hourmeter
- Fuel gauge
- Engine coolant temperature gauge
- Engine oil-pressure warning light and buzzer
- Torque converter oil-temperature gauge
- Torque converter oil-pressure light
- Alternator control lamp
- Parking brake indicator light
- Ammeter charging

2.2.8 Electrical System

The systems voltage shall be 12 V.

One battery of 12 V, at least 90 Ah at 20-hr.-rate, maintenance free and suitable for tropical conditions with a battery main isolating switch shall be supplied.

Lighting:

- Head lights, well protected
- Floodlight mounted to rear of cab

A central fuse box is required, inline fuses are not permitted.

2.2.9 Fork Attachment

The forklift truck shall be equipped with a fork carriage and hydraulic harbour clamp with load protection guard.

2.2.10 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a paint system according to the manufacturer's standard, preferably a solvent and heavy-metal-free (acrylic water based paint), with not less than four (4) coats of paint:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Paint shade to RAL 2009 Traffic Orange
or RAL 1023 Traffic Yellow

Mast, carriage and forks RAL 9005 Flat Black.

Danger stripes in black paint across the counter-weight are required.

This colour scheme may be altered by the Purchaser.

2.2.10.1 Purchaser's Logo

The Purchaser's logo shall be prominently displayed on the outside of the truck in positions indicated by the Purchaser.

2.3 Design Criteria

2.3.1 General Design

The general design and the stability design of the forklift truck shall conform to the requirements of

DIN 15138
FEM Section III
ISO
BS 5750 Part 1.

The Bidder shall state the standards used in its design.

2.3.2 Mechanical Design

2.3.2.1 General

The mechanical design of load-carrying parts shall be calculated to FEM Section III A, DIN 15173. Any pinch and shear points on the upright and carriage shall be avoided.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility for lubrication, inspection and maintenance.

2.3.2.2 Bearings
Bearings on the forklift truck shall be of the anti-friction type.

2.3.2.3 Lubrication
Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for speed reducer and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. All pedal shafts, steering axles and lift cylinder mountings shall be greasable. The oil for lubrication shall be of the type and make as used in Azerbaijan.

2.3.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors should be introduced into the forklift truck's design, whenever practical.

2.3.3.1
Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of systems down time. The Bidder shall list in its proposal systems for which such diagnostic procedures will be supplied.

2.3.3.2 Accessibility
Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the hardware and its layout in the forklift truck shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

2.3.4 Electrical Design

2.3.4.1 General
All electrical equipment, materials and workmanship shall conform to the applicable current standards of BS, ASA, VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 50 degrees centigrade of ambient temperature. Nameplates shall be engraved on phenolic plastic, attached to the equipment with corrosion-resistant rivets.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.3.4.2 Wiring
Electrical wiring throughout the forklift truck shall be dimensioned in accordance with the circuit's current-carrying requirements.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimise vibration damage.

2.3.5 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high-quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and control over all testing and special processes, checking manufacturing methods, materials and bought-in supplied items, for compliance with the applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspections reports shall be furnished for:

(a) Engine
(b) Transmission
(c) Hydraulic pumps and cylinders
(d) Steel used in load bearing structural frame members
(e) Brakes
(f) Welders' certifications
(g) Safety devices
(h) Forks
(i) Attachments
(k) Chain certificate
(l) Capacity certificate

2.4 Final Adjustment and Testing

After the forklift truck has been erected, adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformity to all requirements defined in these Specifications.

The Contractor shall submit to the Purchaser for approval the full testing programme, including the contents of tests, methods of conducting, control and measuring, required instruments and equipment.

The Purchaser will provide the operator and the necessary loads.

Final testing process shall consist of the following main stages:

(a) Static test
(b) Dynamic test
(c) Testing of safety devices
(d) Testing of speeds
(e) Operations test

These tests shall prove that all indicated data are in conformity with the Contractor's specifications.

2.5 Safety Arrangements

2.5.1

General assembly and detail design of the forklift truck shall conform to the safety regulations and codes listed in the Contract added by the following:

2.5.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.5.3

All rotating parts shall be provided with rigid safety guards.

2.5.4

Unavoidable hazardous points shall be marked with a special warning paint (yellow/orange and black stripes).

2.6 General Instructions

2.6.1 Bidder-Supplied Information

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.
The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

3. Data Sheet

3.1

The Bidder shall enclose with its proposal a data sheet according to DIN 15140 specification.

3.2

Additionally, the following shall be provided with the data sheet:

3.2.1

Data sheets on all main components such as engine, transmission and hydraulic components.

3.2.2

Dimensional drawing of the forklift truck.

3.2.3

Load diagram for standard fork operations.

3.2.4

Statement-indicating maximum ground pressure.

□

4. Spare Parts And Special Tools

4.1 Purchaser's Required Spare Parts Lists

The Bidder shall submit with its bid the following list of required spare parts, duly completed and priced:

Group 1: Cylinder Block and Head
Group 2: Injection System
Group 3: Cooling System and Oil Cooler
Group 4: Air Lines
Group 5: Electrical System
Group 6: Torque Converter and Transmission
Group 7: Drive Shaft and Differential
Group 8: Steering and Brake System
Group 9: Hydraulic Systems
Group 10: Frame and Cabin
Group 11: Mast and Carriage

Price basis shall be "Ex Works".

4.1.1 Group 1: Cylinder Block and Head

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Liner, cylinder		
2	1	pc	Crankshaft assy		
3	1	pc	Main bearing, crankshaft		
4	1	pc	Cylinder head assy		
5	1	pc	Exhaust valve		
6	1	pc	Inlet valve		
7	1	pc	Cylinder head gasket		
8	1	pc	Oil filter element		
9	1	pc	Oil pump		
10	1	pc	Cylinder ring set		
11	1	pc	Gasket set, overhauling		
12	1	pc	Engine complete, new		
Total Price, ex works					

4.1.2 Group 2: Injection System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Fuel filter elements		
2	1	pc	Fuel pump assy		
3	1	pc	Injection pump assy		
Total Price, ex works					

4.1.3 Group 3: Cooling System and Oil Cooler

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	V-belt set		
2	1	pc	Radiator		
3	1	pc	Oil cooler		
4	1	pc	Water pump assy		
Total Price, ex works					

4.1.4 Group 4: Air Lines

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Turbocharger, assy		
2	1	pc	Air filter, element		
3	1	pc	Exhaust muffler		
4	1	pc	Exhaust tube, assy		
Total Price, ex works					

4.1.5 Group 5: Electrical System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Battery		
2	1	pc	V-belt set		
3	1	pc	Alternator		
4	1	pc	Starter		
5	1	pc	Lamp assy, front		
6	1	pc	Horn		
7	1	pc	Lamp assy, rear		
Total Price, ex works					

4.1.6 Group 6: Torque Converter and Transmission

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Oil filter element		
2	1	pc	Oil filter assy		
3	1	pc	Clutch group		
4	1	pc	Control valve		
5	1	pc	Transmission, group		
Total Price, ex works					

4.1.7 Group 7: Drive Shaft and Differential

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Gasket kit differential assy		
2	1	pc	Oil seal ring differential assy		
3	1	pc	Bearing set differential assy		
4	1	pc	Joint cardan		
5	1	pc	Oil seal ring, drive axle front		
6	1	pc	Bearing set, drive axle front		
7	1	pc	Tyre, front		
8	1	pc	Tyre, rear		
Total Price, ex works					

4.1.8 Group 8: Steering and Brake System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Steering cylinder assy		
2	1	pc	Bearing set		
3	1	pc	Brake disc		
4	1	pc	Brake pad		
5	1	pc	Pump, assy		
6	1	pc	Repair kit, pump assy		
7	1	pc	Brake master cylinder		
Total Price, ex works					

4.1.9 Group 9: Hydraulic Systems

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Hydraulic pump assy		
2	1	pc	Repair kit, hydraulic pump		
3	1	pc	Control valve, hydraulic pump		
4	1	pc	Hydraulic filter elements		
5	1	pc	Lift cylinder, assy		
6	1	pc	Tilt cylinder		
7	1	pc	Gasket kit, tilt cylinder		
8	1	pc	Hose assy, lift cylinder		
9	1	pc	Hose assy, tilt cylinder		
10	1	pc	Hose assy, sideshift cylinder		
Total Price, ex works					

4.1.10 Group 10: Frame and Cabin

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Windscreen, front		
2	1	pc	Windscreen, rear		
3	1	pc	Windscreen, side		
Total Price, ex works					

4.1.11 Group 11: Mast and Carriage

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Chain		
2	1	pc	Roller set, carriage		
3	1	pc	Roller set, mast		
4	1	pc	Sideshift cylinder		
Total Price, ex works					

4.2 Bidder's Recommended Spare Parts and Special Tools Lists

The Bidder shall prepare and submit to the Purchaser recommended and priced spare parts lists for a period of operation of 3,000 hours.

The spare parts lists should include the following data elements:

- Sequence number
- Bidder's part number
- Item description
- Figure and item number in the illustrated parts breakdown/drawing if applicable
- Quantity
- Unit price
- Total price

The Bidder shall prepare and submit to the Purchaser recommended and priced special tools which are required but not included in the delivery.

□

5. Bill of Quantities

Item	Description	Unit	Qty	Unit Cost	Total Cost
	2.5-t Forklift Truck	pc	12		
	Bale Clamp, 2.5 t	pc	12		
4.1	Purchaser's Required Spare Parts	set	4		
Total, FOB					
Sea freight to Batumi					
Insurance to Batumi					
Total, CIF Batumi					

Delivery Period to Batumi ..... weeks

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 10: 2.5-t Forklift Truck (4 m)

Table of Contents

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 11: 2.5-t Forklift Truck/ Stuffer

Table of Contents

1. General Description

These Specifications describe a 2.5-t-Forklift-Truck (stevedoring configuration) which shall be purchased by the Beneficiary as mentioned in the Bill of Quantities, and which shall be used for stripping and stuffing of 8'-6" height containers.

2. Operating Characteristics

2.1 Operations Characteristics

2.1.1 Lifting Capacity

2.1.1.1
Basic capacity with side-shifting fork positioning carriage at load centre of 500 mm shall be: 2,500 kg

2.1.1.2
Residual capacity at the required lifting height of 3,000 mm at a load centre of 800 mm shall be: 2,000 kg

2.1.1.3
Lifting height with standard drop forks, minimum 4,000 mm

2.1.1.4
Mast construction shall be of the free-view-type, triplex, full free lift, minimum 1,300 mm

2.1.1.5 Tilt Angles
Forward 6 degrees
Backward 12 degrees

2.1.1.6 Forks
Standard forks, length 1,100 mm

2.1.2 Speeds

2.1.2.1	Driving speed forward	25 km/h - 30 km/h
2.1.2.2	Driving speed backward	25 km/h - 30 km/h
2.1.2.3	Lifting with load	0.45 m/s - 0.50 m/s
2.1.2.4	Lifting without load	0.50 m/s - 0.60 m/s
2.1.2.5	Lowering with load	0.40 m/s - 0.55 m/s
2.1.2.6	Lowering without load	0.40 m/s - 0.50 m/s

2.1.3 Major Dimensions

2.1.3.1	Overall length L1 + L2 incl. forks, maximum	4,000 mm
2.1.3.2	Overall width B, maximum	1,900 mm
2.1.3.3	Height, mast lowered h1, maximum	2,150 mm
2.1.3.4	Turning radius WA, maximum	3,100 mm
2.1.3.5	Ast 4, maximum	4,500 mm

2.1.4 Protective Devices

2.1.4.1
Safety hydraulic lock valves shall be provided on all load-bearing hydraulic cylinders (tilting and lifting).

2.1.4.2
Hydraulic counterbalance valves shall be provided on load-lowering motions.

2.2 Main Technical and Design Demands

2.2.1 Main Frame Construction

The main frame shall be an all-welded, torsion-resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect.

The frame structure shall provide efficient protection for all internal parts, especially for the fuel and hydraulic oil tanks.

Sling eyes shall be provided on the frame structure and counterweight to enable the lifting of the truck by crane. The counterweight is to be quickly detachable.

The Bidder shall indicate the length of the lifting ropes required.

2.2.2 Power Plant

2.2.2.1
A Diesel Engine with direct fuel injection shall be provided. Preferably, the engine shall not be turbo-charged. The Bidder shall offer two alternative makes of engines with full technical details.

2.2.2.2

The engine power shall be	minimum	35 kW
	maximum	50 kW

(rating according to DIN 6271).

2.2.2.3 Engine-Cooling System
The engine-cooling system shall be designed to work in a tropical climate.

2.2.2.4 Engine Air Inlet
The engine air inlet system shall be of Donaldson type or equivalent, cyclonic pre-cleaner and double-stage dry paper element type with air-restriction indicator.

2.2.2.5 Silencer
Required is a heavy-duty type, mounted in an upswept position.

2.2.2.6 Engine Oil Filter
Full-flow heavy-duty engine oil filters with a replaceable filter element shall be supplied.

2.2.2.7 Engine Protection System
An automatic engine shut-off protection system, which shall be electrically operated via solenoid valve at the injection pump, shall be provided.
The system shall monitor:

- low engine oil pressure
- high engine oil temperature
- high coolant temperature
- high transmission oil temperature

2.2.2.8 Fuel System
Fuel tank capacity shall be 40 - 60 litres. Water separator and dual fuel filter with replaceable elements shall be provided.

2.2.3 Transmission

2.2.3.1
A power shift transmission incorporating a torque converter, with multiple stages for forward and reverse, shall be provided. Pressure-testing connections on the gearbox and power take-offs for the hydraulic pump shall be provided.

2.2.3.2 Transmission Oil System
The transmission oil system shall have a separate oil cooler and a full-flow heavy-duty oil filter with a replaceable element. The system shall be capable of tropical zone operations.

2.2.4 Travel Gear

2.2.4.1 Drive Axle
The drive axle shall be fixed and be of heavy-duty type with planetary axle and hub reduction.

2.2.4.2 Steering Axle
The steering axle shall be of heavy-duty type with one hydraulic cylinder.

2.2.4.3 Tyres

Tyres shall be of superelastic type. The two tyres on the drive axle and the two tyres on the steering axle shall preferably be of the same size. The Bidder shall offer alternative sizes of tyres to reach the maximum reduction of the front axle load.

2.2.5 Brakes

2.2.5.1 Service Brakes

The service brakes shall either be two hydraulically-operated disk or drum brakes on the drive axle.

2.2.5.2 Parking Brake

The parking brake shall be spring-actuated and mechanically operated.

2.2.6 Hydraulic System

2.2.6.1

The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Independent lines shall be provided for
- steering
- piloting
- lifting
- tilting
- side-shifting

2.2.6.2

The hydraulic system shall be protected against pump failures due to contamination by high-pressure cartridge-type filters fitted on the delivery lines.
In addition, in the return line, full flow, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection and a clogged condition indicator. The preferable filter micron rating shall be 10 microns.

2.2.6.3

A full flow fin and tube-type, oil to air hydraulic fluid cooler shall be provided in the hydraulic system to maintain safe operating temperatures.

2.2.6.4

The hydraulic oil tank drain plug shall be of magnetic type.

2.2.6.5

The main valve of the mast-lowering brake shall be installed in or directly mounted to the lifting cylinder.

2.2.6.6

The truck shall be equipped with a 4-way hydraulic valve.

2.2.6.7

Quick detachable hose couplings for attachments shall be provided on the truck.

2.2.7 Operator's Compartment and Overhead Guard

The driver's seat shall be of the full suspension type. Compartment and overhead guard shall meet FOPS criteria ISO 3449 and FEM.

The driver's overhead guard shall be covered with a suitable transparent plastic, fastened in a noise-reducing manner.

2.2.7.1 Operator's Console

The operator's console shall include all necessary controls for the Forklift's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

The following instruments shall be provided:

- Hourmeter
- Fuel gauge
- Engine coolant temperature gauge
- Engine oil-pressure warning light and buzzer
- Torque converter oil-temperature gauge
- Torque converter oil-pressure light
- Alternator control lamp
- Parking brake indicator light
- Ammeter charging

2.2.8 Electrical System

The systems voltage shall be 12 V.

One battery of 12 V, at least 90 Ah at 20-hr.-rate, maintenance free and suitable for tropical conditions with a battery main isolating switch shall be supplied.

Lighting:

- Head lights, well protected
- Floodlight mounted to rear of cab

A central fuse box is required, inline fuses are not permitted.

2.2.9 Fork Attachment

The forklift truck shall be equipped with a fork carriage and hydraulic harbour clamp with load protection guard.

2.2.10 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a paint system according to the manufacturer's standard, preferably a solvent and heavy-metal-free (acrylic water based paint), with not less than four (4) coats of paint:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Paint shade to RAL 2009 Traffic Orange
or RAL 1023 Traffic Yellow

Mast, carriage and forks RAL 9005 Flat Black.

Danger stripes in black paint across the counter-weight are required.

This colour scheme may be altered by the Purchaser.

2.2.10.1 Purchaser's Logo
The Purchaser's logo shall be prominently displayed on the outside of the truck in positions indicated by the Purchaser.

2.3 Design Criteria

2.3.1 General Design

The general design and the stability design of the forklift truck shall conform to the requirements of

DIN 15138
FEM Section III
ISO
BS 5750 Part 1.

The Bidder shall state the standards used in its design.

2.3.2 Mechanical Design

2.3.2.1 General
The mechanical design of load-carrying parts shall be calculated to FEM Section III A, DIN 15173. Any pinch and shear points on the upright and carriage shall be avoided.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility for lubrication, inspection and maintenance.

2.3.2.2 Bearings
Bearings on the forklift truck shall be of the anti-friction type.

2.3.2.3 Lubrication

Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for speed reducer and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. All pedal shafts, steering axles and lift cylinder mountings shall be greasable. The oil for lubrication shall be of the type and make as used in the Beneficiary's country.

2.3.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors should be introduced into the forklift truck's design, whenever practical.

2.3.3.1

Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of systems down time. The Bidder shall list in its proposal systems for which such diagnostic procedures will be supplied.

2.3.3.2 Accessibility

Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the hardware and its layout in the forklift truck shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

2.3.4 Electrical Design

2.3.4.1 General

All electrical equipment, materials and workmanship shall conform to the applicable current standards of BS, ASA, VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 50 degrees centigrade of ambient temperature. Nameplates shall be engraved on phenolic plastic, attached to the equipment with corrosion-resistant rivets.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.3.4.2 Wiring

Electrical wiring throughout the forklift truck shall be dimensioned in accordance with the circuit's current-carrying requirements.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimise vibration damage.

2.3.5 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high-quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and control over all testing and special processes, checking manufacturing methods, materials and bought-in supplied items, for compliance with the applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspections reports shall be furnished for:

(a) Engine
(b) Transmission
(c) Hydraulic pumps and cylinders
(d) Steel used in load bearing structural frame members
(e) Brakes
(f) Welders' certifications
(g) Safety devices
(h) Forks
(i) Attachments
(k) Chain certificate
(l) Capacity certificate

2.4 Final Adjustment and Testing

After the forklift truck has been erected, adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformity to all requirements defined in these Specifications.

The Contractor shall submit to the Purchaser for approval the full testing programme, including the contents of tests, methods of conducting, control and measuring, required instruments and equipment.

The Purchaser will provide the operator and the necessary loads.

Final testing process shall consist of the following main stages:

(a) Static test
(b) Dynamic test
(c) Testing of safety devices
(d) Testing of speeds
(e) Operations test

These tests shall prove that all indicated data are in conformity with the Contractor's specifications.

2.5 Safety Arrangements

2.5.1

General assembly and detail design of the forklift truck shall conform to the safety regulations and codes listed in the Contract added by the following:

2.5.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.5.3

All rotating parts shall be provided with rigid safety guards.

2.5.4

Unavoidable hazardous points shall be marked with a special warning paint (yellow/orange and black stripes).

2.6 General Instructions

2.6.1 Bidder-Supplied Information

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.
The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

3. Data Sheet

3.1

The Bidder shall enclose with its proposal a data sheet according to DIN 15140 specification.

3.2

Additionally, the following shall be provided with the data sheet:

3.2.1

Data sheets on all main components such as engine, transmission and hydraulic components.

3.2.2

Dimensional drawing of the forklift truck.

3.2.3

Load diagram for standard fork operations.

3.2.4

Statement-indicating maximum ground pressure.

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4. Spare Parts And Special Tools

4.1 Purchaser's Required Spare Parts Lists

The Bidder shall submit with its bid the following list of required spare parts, duly completed and priced:

Group 1: Cylinder Block and Head
Group 2: Injection System
Group 3: Cooling System and Oil Cooler
Group 4: Air Lines
Group 5: Electrical System
Group 6: Torque Converter and Transmission
Group 7: Drive Shaft and Differential
Group 8: Steering and Brake System
Group 9: Hydraulic Systems
Group 10: Frame and Cabin
Group 11: Mast and Carriage

Price basis shall be "Ex Works".

□

4.1.1 Group 1: Cylinder Block and Head

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Liner, cylinder		
2	1	pc	Crankshaft assy		
3	1	pc	Main bearing, crankshaft		
4	1	pc	Cylinder head assy		
5	1	pc	Exhaust valve		
6	1	pc	Inlet valve		
7	1	pc	Cylinder head gasket		
8	1	pc	Oil filter element		
9	1	pc	Oil pump		
10	1	pc	Cylinder ring set		
11	1	pc	Gasket set, overhauling		
12	1	pc	Engine complete, new		
Total Price, ex works					

4.1.2 Group 2: Injection System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Fuel filter elements		
2	1	pc	Fuel pump assy		
3	1	pc	Injection pump assy		
Total Price, ex works					

4.1.3 Group 3: Cooling System and Oil Cooler

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	V-belt set		
2	1	pc	Radiator		
3	1	pc	Oil cooler		
4	1	pc	Water pump assy		
Total Price, ex works					

4.1.4 Group 4: Air Lines

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Turbocharger, assy		
2	1	pc	Air filter, element		
3	1	pc	Exhaust muffler		
4	1	pc	Exhaust tube, assy		
Total Price, ex works					

4.1.5 Group 5: Electrical System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Battery		
2	1	pc	V-belt set		
3	1	pc	Alternator		
4	1	pc	Starter		
5	1	pc	Lamp assy, front		
6	1	pc	Horn		
7	1	pc	Lamp assy, rear		
Total Price, ex works					

4.1.6 Group 6: Torque Converter and Transmission

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Oil filter element		
2	1	pc	Oil filter assy		
3	1	pc	Clutch group		
4	1	pc	Control valve		
5	1	pc	Transmission, group		
Total Price, ex works					

4.1.7 Group 7: Drive Shaft and Differential

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Gasket kit differential assy		
2	1	pc	Oil seal ring differential assy		
3	1	pc	Bearing set differential assy		
4	1	pc	Joint cardan		
5	1	pc	Oil seal ring, drive axle front		
6	1	pc	Bearing set, drive axle front		
7	1	pc	Tyre, front		
8	1	pc	Tyre, rear		
Total Price, ex works					

4.1.8 Group 8: Steering and Brake System

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Steering cylinder assy		
2	1	pc	Bearing set		
3	1	pc	Brake disc		
4	1	pc	Brake pad		
5	1	pc	Pump, assy		
6	1	pc	Repair kit, pump assy		
7	1	pc	Brake master cylinder		
Total Price, ex works					

4.1.9 Group 9: Hydraulic Systems

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Hydraulic pump assy		
2	1	pc	Repair kit, hydraulic pump		
3	1	pc	Control valve, hydraulic pump		
4	1	pc	Hydraulic filter elements		
5	1	pc	Lift cylinder, assy		
6	1	pc	Tilt cylinder		
7	1	pc	Gasket kit, tilt cylinder		
8	1	pc	Hose assy, lift cylinder		
9	1	pc	Hose assy, tilt cylinder		
10	1	pc	Hose assy, sideshift cylinder		
Total Price, ex works					

4.1.10 Group 10: Frame and Cabin

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Windscreen, front		
2	1	pc	Windscreen, rear		
3	1	pc	Windscreen, side		
Total Price, ex works					

4.1.11 Group 11: Mast and Carriage

Item	Qty	Unit	Description	Unit Price	Total Price
1	1	pc	Chain		
2	1	pc	Roller set, carriage		
3	1	pc	Roller set, mast		
4	1	pc	Sideshift cylinder		
Total Price, ex works					

4.2 Bidder's Recommended Spare Parts and Special Tools Lists

The Bidder shall prepare and submit to the Purchaser recommended and priced spare parts lists for a period of operation of 3,000 hours.

The spare parts lists should include the following data elements:

- Sequence number
- Bidder's part number
- Item description
- Figure and item number in the illustrated parts breakdown/drawing if applicable
- Quantity
- Unit price
- Total price

The Bidder shall prepare and submit to the Purchaser recommended and priced special tools which are required but not included in the delivery.

5. Bill of Quantities

Item	Description	Unit	Qty	Unit Cost	Total Cost
	2.5-t Forklift Truck	pc			
	Harbour Clamp, 2.5 t	pc			
	Bale Clamp, 2.5 t	pc			
4.1	Purchaser's Required Spare Parts	set	1		
Total, FOB					
Sea freight to Batumi					
Insurance to Batumi					
Total, CIF Batumi					

Delivery Period to the Port of Batumi ..... weeks

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 13: Electric Hand Pallet Truck

Table of Contents

1. General Description

These Specifications describe a 2-t Electric Hand Pallet Truck which shall be purchased by the Beneficiary and which shall be used for stripping and stuffing of containers, railway wagons and tractors/trailers.

2. Operating Characteristics

2.1 Operations Characteristics

2.1.1 Lifting Capacity

2.1.1.1 Basic capacity at load centre of 600 mm shall be:	2,000 kg
2.1.1.2 Lifting height with standard drop forks, minimum	100 mm
2.1.1.3 Forks Standard forks, length	1,100 mm

2.1.2 Speeds

2.1.2.1 Driving speed forward	5 km/h - 6 km/h
2.1.2.2 Driving speed backward	5 km/h - 6 km/h
2.1.2.3 Lifting with load	35 cm/s – 40 cm/s
2.1.2.4 Lifting without load	40 cm/s – 50 cm/s

2.1.3 Major Dimensions

2.1.3.1 Overall length L1 + L2 incl. forks, maximum	1,800 mm
2.1.3.2 Overall width B, maximum	700 mm
2.1.3.3 Turning radius WA, maximum	1,500 mm

2.2 Main Technical and Design Demands

2.2.1 Main Frame Construction

The main frame shall be an all-welded, torsion-resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect.

The frame structure shall provide efficient protection for all internal parts, especially for the battery and hydraulic oil tanks.

Sling eyes shall be provided on the frame structure to enable the lifting of the pallet truck by crane.

The Bidder shall indicate the length of the lifting ropes required to lift the pallet truck by crane.

2.2.2 Power Plant

2.2.2.1
The pallet truck shall be electrically operated, powered by one set of heavy-duty batteries.

2.2.2.2

The motor power shall be	minimum	0.8 kW
	maximum	1.0 kW

2.2.2.3 Motor Shut-Off
An automatic motor shut-off system shall be provided, which shall be integrated into the drive handle system.

2.2.3 Transmission

2.2.3.1
A transmission with multiple stages for forward and reverse shall be provided.

2.2.4 Travel Gear

2.2.4.1 Drive and Steering Axle
The drive axle shall be fixed and be of heavy-duty type with planetary axle and hub reduction.

2.2.4.2 Tyres/Rolls
Tyres shall be of valkanol type.

Tyre size front:	minimum	100 mm
Tyre size rear:	minimum	200 mm

2.2.5 Brakes

2.2.5.1 Service Brakes

The service brakes shall be hydraulically operated disk or drum brakes on the drive axle. The service brake shall serve as parking brake when the pallet truck is not operated.

2.2.6 Hydraulic System

2.2.6.1
The hydraulic system shall preferably be powered by gear-type hydraulic pumps.

2.2.7 Pallet Truck Operation

The pallet truck shall be handled by integrated switches in the draw bar handle.

The following instruments shall be provided:

- Hourmeter
- Ammeter gauge

2.2.8 Electrical System

The system's voltage shall be 24 V.

One battery of 24 V, at least 130 Ah at 20-hr.-rate, maintenance free and suitable for tropical conditions with a battery main isolating switch shall be supplied.

An integrated automatic battery charger shall be installed inside the truck.

A central fuse box is required, inline fuses are not permitted.

2.2.9 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a paint system according to the manufacturer's standard, preferably a solvent and heavy-metal-free (acrylic water based paint), with not less than four (4) coats of paint:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Paint shade to RAL 2009 Traffic Orange
or RAL 1023 Traffic Yellow

Carriage and forks RAL 9005 Flat Black.

Danger stripes in black paint across the counter-weight are required.

This colour scheme may be altered by the Purchaser.

2.3 Design Criteria

2.3.1 General Design

The general design and the stability design of the forklift truck shall conform to the requirements of

DIN 15138
FEM Section III
ISO
BS 5750 Part 1.

The Bidder shall state the standards used in its design.

2.3.2 Mechanical Design

2.3.2.1 General

The mechanical design of load-carrying parts shall be calculated to FEM Section III A, DIN 15173. Any pinch and shear points on the upright and carriage shall be avoided.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility for lubrication, inspection and maintenance.

2.3.2.2 Bearings

Bearings on the forklift truck shall be of the anti-friction type.

2.3.2.3 Lubrication

Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for speed reducer and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. All pedal shafts, steering axles and lift cylinder mountings shall be greasable. The oil for lubrication shall be of the type and make as used in the Beneficiary's country.

2.3.4 Electrical Design

2.3.4.1 General

All electrical equipment, materials and workmanship shall conform to the applicable current standards of BS, ASA, VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 50 degrees centigrade of ambient temperature. Nameplates shall be engraved on phenolic plastic, attached to the equipment with corrosion-resistant rivets.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.3.4.2 Wiring

Electrical wiring throughout the forklift truck shall be dimensioned in accordance with the circuit's current-carrying requirements.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimise vibration damage.

2.3.5 Quality Control

Test and inspections reports shall be furnished for:

(a) Electric motor
(b) Transmission
(c) Hydraulic pumps
(d) Brakes
(e) Safety devices
(f) Forks
(g) Capacity certificate

2.4 Safety Arrangements

2.4.1

General assembly and detail design of the forklift truck shall conform to the safety regulations and codes listed in the Contract added by the following:

2.4.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.5 General Instructions

2.5.1 Bidder-Supplied Information

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.

The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

3. Data Sheet

3.1

The Bidder shall enclose with its proposal a data sheet according to DIN 15140 specification.

3.2

Additionally, the following shall be provided with the data sheet:

3.2.1

Data sheets on all main components such as electric motor, transmission and hydraulic components.

3.2.2

Dimensional drawing of the hand pallet truck.

3.2.3

Load diagram for standard fork operations.

3.2.4

Statement-indicating maximum ground pressure.

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 14: Wheel Loader/ Bobcat

Table of Contents

2.2.6 Hydraulic System

2.2.6.1
The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Independent lines shall be provided for
- steering
- piloting
- lifting

2.2.6.2
The hydraulic system shall be protected against pump failures due to contamination by high-pressure cartridge-type filters fitted on the delivery lines.

In addition, in the return line, full flow, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection and a clogged condition indicator. The preferable filter micron rating shall be 10 microns.

2.2.6.3
A full flow fin and tube-type, oil to air hydraulic fluid cooler shall be provided in the hydraulic system to maintain safe operating temperatures.

2.2.6.4
The hydraulic oil tank drain plug shall be of magnetic type.

2.2.6.5
The main valve of the mast-lowering brake shall be installed in or directly mounted to the lifting cylinder.

2.2.6.6
The truck shall be equipped with a 4-way hydraulic valve.

2.2.6.7
Quick detachable hose couplings for attachments shall be provided on the truck.

2.2.7 Operator's Compartment and Overhead Guard

The driver's seat shall be of the full suspension type. Compartment and overhead guard shall meet FOPS criteria ISO 3449, FEM and ROPS.

The driver's overhead guard shall be covered with a suitable transparent plastic, fastened in a noise-reducing manner.

The driver's seat shall be protected from the sides and the rear by mashed window girders.

2.2.7.1 Operator's Console

The operator's console shall include all necessary controls for the wheel loader's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

1. General Description

These Specifications describe a wheel loader (similar to Bobcat) which shall be purchased by the Beneficiary, and which shall be used for bulk handling inside ships.

2. Operating Characteristics

2.1 Operations Characteristics

2.1.1 Lifting Capacity

2.1.1.1
Basic capacity at load centre of 500 mm shall be: 600 kg

2.1.1.2
Lifting height with standard bucket, minimum 3,000 mm

2.1.1.3
Lifting construction shall be of the free-view-type.

2.1.1.4 Bucket Size
Standard bucket width, minimum 1,600 mm
Standard bucket capacity (driven), minimum 600 kg

2.1.2 Speeds

2.1.2.1 Driving speed forward 10 km/h - 15 km/h

2.1.2.2 Driving speed backward 10 km/h - 15 km/h

2.1.3 Major Dimensions

2.1.3.1 Overall length incl. bucket, maximum 3,500 mm

2.1.3.2 Overall width, maximum 1,900 mm

2.1.3.3 Height, mast lowered, maximum 2,150 mm

2.1.3.4 Turning radius, maximum 2,000 mm

2.1.4 Protective Devices

2.1.4.1
Safety hydraulic lock valves shall be provided on all load-bearing hydraulic cylinders.

2.1.4.2
Hydraulic counterbalance valves shall be provided on load-lowering motions.

2.2 Main Technical and Design Demands

2.2.1 Main Frame Construction

The main frame shall be an all-welded, torsion-resistant frame, utilising the most modern design techniques to provide an attractive structure with a minimum of maintenance. The design shall avoid pockets where water may collect.

The frame structure shall provide efficient protection for all internal parts, especially for the fuel and hydraulic oil tanks.

Sling eyes shall be provided on the frame structure and counterweight to enable the lifting of the truck by crane.

The Bidder shall indicate the length of the lifting ropes required.

2.2.2 Power Plant

2.2.2.1
A Diesel Engine with direct fuel injection shall be provided. Preferably, the engine shall not be turbo-charged. The Bidder shall offer two alternative makes of engines with full technical details.

2.2.2.2

The engine power shall be	minimum	35 kW
	maximum	50 kW

(rating according to DIN 6271).

2.2.2.3 Engine-Cooling System
The engine-cooling system shall be designed to work in a tropical climate and inside ships.

2.2.2.4 Engine Air Inlet
The engine air inlet system shall be of Donaldson type or equivalent, cyclonic pre-cleaner and double-stage dry paper element type with air-restriction indicator.

2.2.2.5 Silencer
Required is a heavy-duty anti-sparking type, mounted in an upswept position.

2.2.2.6 Engine Oil Filter
Full-flow heavy-duty engine oil filters with a replaceable filter element shall be supplied.

2.2.2.7 Engine Protection System

An automatic engine shut-off protection system, which shall be electrically operated via solenoid valve at the injection pump, shall be provided.

The system shall monitor:

- low engine oil pressure
- high engine oil temperature
- high coolant temperature
- high transmission oil temperature

2.2.2.8 Fuel System

Fuel tank capacity shall be 40 - 60 litres. Water separator and dual fuel filter with replaceable elements shall be provided.

2.2.3 Transmission

2.2.3.1

A hydrostatic transmission working on all four wheels for forward and reverse shall be provided. Pressure-testing connections on the gearbox and power take-offs for the hydraulic pump shall be provided.

2.2.3.2 Transmission Oil System

The transmission oil system shall have a separate oil cooler and a full-flow heavy-duty oil filter with a replaceable element. The system shall be capable of tropical zone operations.

2.2.4 Travel Gear

2.2.4.1 Front and Rear Axle

The axle shall be fixed and be of heavy-duty type.

2.2.4.2 Tyres

Tyres shall be of superelastic type or pneumatic with tyrefill, and be of the same size.

2.2.5 Brakes

2.2.5.1 Service Brakes

The service brakes shall be hydraulically-operated disk brakes on the axle.

2.2.5.2 Parking Brake

The parking brake shall be spring-actuated and mechanically operated.

2.2.6 Hydraulic System

2.2.6.1
The hydraulic system shall preferably be powered by gear-type hydraulic pumps, driven by power take-offs mounted on the torque converter.

Independent lines shall be provided for
- steering
- piloting
- lifting

2.2.6.2
The hydraulic system shall be protected against pump failures due to contamination by high-pressure cartridge-type filters fitted on the delivery lines.

In addition, in the return line, full flow, replaceable cartridge-type filters shall be provided. These filters shall have a bypass protection and a clogged condition indicator. The preferable filter micron rating shall be 10 microns.

2.2.6.3
A full flow fin and tube-type, oil to air hydraulic fluid cooler shall be provided in the hydraulic system to maintain safe operating temperatures.

2.2.6.4
The hydraulic oil tank drain plug shall be of magnetic type.

2.2.6.5
The main valve of the mast-lowering brake shall be installed in or directly mounted to the lifting cylinder.

2.2.6.6
The truck shall be equipped with a 4-way hydraulic valve.

2.2.6.7
Quick detachable hose couplings for attachments shall be provided on the truck.

2.2.7 Operator's Compartment and Overhead Guard

The driver's seat shall be of the full suspension type. Compartment and overhead guard shall meet FOPS criteria ISO 3449, FEM and ROPS.

The driver's overhead guard shall be covered with a suitable transparent plastic, fastened in a noise-reducing manner.

The driver's seat shall be protected from the sides and the rear by mashed window girders.

2.2.7.1 Operator's Console

The operator's console shall include all necessary controls for the wheel loader's normal operations. All control wiring shall end on terminal blocks appropriately marked with corresponding wire numbers. All console control equipment shall be dimensioned for heavy-duty continuous operations.

The following instruments shall be provided:

- Hour meter
- Fuel gauge
- Engine coolant temperature gauge
- Engine oil-pressure warning light and buzzer
- Torque converter oil-temperature gauge
- Torque converter oil-pressure light
- Alternator control lamp
- Parking brake indicator light
- Ammeter charging

2.2.8 Electrical System

The systems voltage shall be 12 V.

One battery of 12 V, at least 90 Ah at 20-hr.-rate, maintenance free and suitable for tropical conditions with a battery main isolating switch shall be supplied.

Lighting:

- Head lights, well protected
- Floodlight mounted to rear of cab
- Indoor light

A central fuse box is required, inline fuses are not permitted.

2.2.9 Attachment

The wheel loader shall be equipped with a bucket of at least 600 kg capacity.

2.2.10 Surface Protection

All structural parts shall be blasted to DIN 55928 SA 2.5 standard and painted with a paint system according to the manufacturer's standard, preferably a solvent and heavy-metal-free (acrylic water based paint), with not less than four (4) coats of paint:

- primer
- two (2) coats of intermediate layers
- top coat

Total dry film thickness shall be not less than 240 microns.

Paint shade to	RAL 2009 Traffic Orange
or	RAL 1023 Traffic Yellow

Danger stripes in black paint across the counter-weight are required.

This colour scheme may be altered by the Purchaser.

2.2.10.1 Purchaser's Logo
The Purchaser's logo shall be prominently displayed on the outside of the truck in positions indicated by the Purchaser.

2.3 Design Criteria

2.3.1 General Design

The general design and the stability design of the wheel loader shall conform to the requirements of

DIN 15138
FEM Section III
ISO
BS 5750 Part 1.

The Bidder shall state the standards used in its design.

2.3.2 Mechanical Design

2.3.2.1 General
The mechanical design of load-carrying parts shall be calculated to FEM Section III A, DIN 15173. Any pinch and shear points on the upright and carriage shall be avoided.

All fasteners or parts likely to become loose by vibration shall be secured by approved devices.

All parts shall be designed to ensure easy assembly, adjustment, removal for replacement and accessibility for lubrication, inspection and maintenance.

2.3.2.2 Bearings
Bearings on the wheel loader shall be of the anti-friction type.

2.3.2.3 Lubrication
Lubrication of all mechanical operating parts shall be provided in accordance with manufacturers' instructions. Oil-type lubrication shall be provided for speed reducer and other major components where lubrication is needed. Lubrication of other mechanical parts shall be effected by means of high-pressure grease introduced through industrial button-type fittings. All pedal shafts, steering axles and lift cylinder mountings shall be greasable. The oil for lubrication shall be of the type and make as used in the Beneficiary's country.

2.3.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors should be introduced into the wheel loader's design, whenever practical.

2.3.3.1
Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of systems down time. The Bidder shall list in its proposal systems for which such diagnostic procedures will be supplied.

2.3.3.2 Accessibility
Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the hardware and its layout in the wheel loader shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

2.3.4 Electrical Design

2.3.4.1 General
All electrical equipment, materials and workmanship shall conform to the applicable current standards of BS, ASA, VDE or their equivalents. All equipment and materials furnished shall be suitable for operations in a humid, marine atmosphere up to 50 degrees centigrade of ambient temperature. Nameplates shall be engraved on phenolic plastic, attached to the equipment with corrosion-resistant rivets.

All electrical equipment furnished shall resist deterioration from corrosion when exposed to severe moisture conditions near salt water.

As far as practicable, all screws, bolts, nuts, pins, studs, springs, washers and other miscellaneous fastenings and fittings shall be of corrosion-resistant material or shall be treated or plated in a manner to render them resistant to corrosion.

2.3.4.2 Wiring
Electrical wiring throughout the wheel loader shall be dimensioned in accordance with the circuit's current-carrying requirements.

Wiring shall be of PVC or neoprene insulation with approved flexible-type switchboard wiring, for control panels to minimise vibration damage.

2.3.5 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high-quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and control over all testing and special processes, checking manufacturing methods, materials and bought-in supplied items, for compliance with the applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspections reports shall be furnished for:

(a) Engine
(b) Transmission
(c) Hydraulic pumps and cylinders
(d) Steel used in load bearing structural frame members
(e) Brakes

(f) Welders' certifications
(g) Safety devices
(h) Attachments
(i) Capacity certificate

2.4 Final Adjustment and Testing

After the wheel loader has been erected, adjusted, lubricated and otherwise made ready for operations, it shall be tested to demonstrate conformity to all requirements defined in these Specifications.

The Contractor shall submit to the Purchaser for approval the full testing programme, including the contents of tests, methods of conducting, control and measuring, required instruments and equipment.

The Purchaser will provide the operator and the necessary loads.

Final testing process shall consist of the following main stages:

(a) Static test
(b) Dynamic test
(c) Testing of safety devices
(d) Testing of speeds
(e) Operations test

These tests shall prove that all indicated data are in conformity with the Contractor's specifications.

2.5 Safety Arrangements

2.5.1

General assembly and detail design of the wheel loader shall conform to the safety regulations and codes listed in the Contract added by the following:

2.5.2

All nuts connecting the moving and rotating parts shall be of the self-locking type to prevent their loosening due to vibration.

2.5.3

All rotating parts shall be provided with rigid safety guards.

2.5.4

Unavoidable hazardous points shall be marked with a special warning paint (yellow/orange and black stripes).

2.6 General Instructions

2.6.1 Bidder-Supplied Information

The Bidder shall submit with its proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Bidder shall offer its standard equipment as close as possible to the given technical specifications. Special design and prototypes will not be accepted.
The offered type of equipment must have been manufactured for at least one year and shall be from the same production lot.

□

3. Data Sheet

3.1

The Bidder shall enclose with its proposal a data sheet according to DIN 15140 specification.

3.2

Additionally, the following shall be provided with the data sheet:

3.2.1

Data sheets on all main components such as engine, transmission and hydraulic components.

3.2.2

Dimensional drawing of the wheel loader.

3.2.3

Load diagram for standard bucket operations.

3.2.4

Statement-indicating maximum ground pressure.

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 15: "HANSE" Pallet

Table of Contents

1. General Description

These Specifications describe a "HANSE"-Pallet which will be purchased by the Beneficiary, and which shall be used for general cargo handling.

2. Operations Characteristics

2.1 Capacity

Load carrying capacity: (for crane and forklift operation)	2,000 kg

2.2 Dimensions

Width:	1,150 mm
Length:	1,800 mm

2.3 Main Technical and Design Demands

Construction to be according to drawing No. G 540 a and following specification.

All wooden parts have to be of beech-wood.

Grain nearly straight grown.

Following imperfections of the wood are not permitted:

- heavily twisted growth
- putrefaction and stained by damp
- worm-eaten or fungoid
- lose knots; grown in knots on both sides are permitted up to a size of 40 mm by 70 mm, if there is a minimum distance between each knot of 100 mm and not more than 4 knot at each board. Grown in knots with a diameter less than 20 mm are allowed.
- cracks; straight cracks with a length less than the width of the board are permitted.
- tree edges; tree edges up to a width of 20 mm (measured on the surface) are permitted.

All screws, nails, nuts and washers to be hot galvanised.

- screws: oval head hot zinc galvanised steel carriage screws 8 mm x 160 mm; DIN 603
- nuts: hexagon hot zinc galvanised nut, 8 mm, DIN 555
- washers: hot zinc galvanised washers, 28 mm x 9.5 mm x 2 mm, DIN 440
- nails: hot zinc galvanised convex ring nails, Form K, 4.2 mm x 90 mm according to DIN 68163
  or
  hot zinc galvanised anti-split screw nails, Form A, 5.2 mm x 90 mm according to DIN 68163

All positions of screws and nails to be according to drawing No. G 540a. All nail holes to be pre-drilled, depth 55 mm.

If anti-crack-screw-nails are used, pre-drilling is not necessary.

All holes for the screws to be countersunk, at least all screws and nuts are not less than 2 mm below the surface of the wood.

All measurements have to be adhered to the drawing, deviations are not acceptable. Wood drying tolerances (shrinkage) according to drawing have to be taken into consideration by cutting fresh wood.

2.4 Marking of Pallet

Coating: outside of the cross beams to be coated with 1 thick layer of traffic yellow, RAL 1023. However, colour may be altered on demand and without additional cost.

Branding: outside of one cross beam the port logo, 2 t and year of manufacturing to be branded not less than 2 mm deep. Type of letters to be according DIN 15146, part 2.

Technical Specifications for Port Handling Equipment for the Ports of Poti and Batumi

Item 17: Workshop Equipment

Table of Contents

1. General Description

These Specifications describe Workshop Equipment grouped into Electrical Workshop Machinery and Electric Measuring and Other Devices, which shall be purchased by the Beneficiary as stipulated in the Bill of Quantities.

2. Equipment Specifications

2.1 Electrical Workshop Machinery

2.1.1 Electric Hand Drilling Machine

- supply voltage: 240V, 50Hz
- electric motor: 0.6 kW
- hammering
- speed: 400-800min^{-1}
- capacity in steel: 18mm
- capacity in concrete: 25mm
- including metal transportation box
- drill chuck for hammering
- 10 pcs of masonry drills: 10-20mm
- 2 sets, HSS drills 1-13mm, 0.5mm steps

2.1.2 Electric Hand Drilling Machine

- supply voltage: 240V, 50Hz
- power consumption: 701/380W
- electronic control
- hammering
- left and right rotation
- capacity in steel: 13mm
- rated speed: 0-650min^{-1}
  0-2,000min^{-1}
- drill chuck: up to 13mm
- according to VDE
- including: metal transportation box

2.1.3 Electric Hand Drilling Machine

- supply voltage: 240V, 50Hz
- power consumption: 1,150/670W
- electronic control
- hammering
- left and right rotation
- capacity in steel: 16mm
- rated speed: 0-700min^{-1}
  0-2100min^{-1}
- drill chuck: up to 13mm
- according to VDE
- including metal transportation box

2.1.4 Cable Reel, Steel

25 m cable reel, 3 x 1.5 mml, with 3 sockets

2.1.5 Electric Angle Grinder

- supply voltage: 240V, 50Hz
- power consumption: 1,900/1,350W
- speed: 8,500min-1
- wheel diameter: up to 180mm
- grinding chuck: M14
- according to VDE
- including metal transportation box

2.1.6 Electric One-Hand Angle Grinder

- supply voltage: 240V, 50Hz
- power consumption: 800/480W
- electronic speed control
- speed: 2,700-10,000min-1
- wheel diameter: up to 115mm
- grinding chuck: M14
- according to VDE
- including metal transportation box

2.1.7 Bench Grinding Machine

- supply voltage: 240V, 50Hz
- power consumption: 280/180W
- speed: 3,000min-1
- size of grinding wheels: 175x20mm

Additional supply:

- pedestal: height: 880mm
  weight: 27 kg

2.1.8 Electric Soldering Tool

- power supply: 240V, 50Hz
- power consumption: 50W
- soldering temperature: 400°C

Additional supply:

- 1 spare 45 soldering tip

2.1.9 Electric Soldering Tool

- power supply: 240V, 50Hz
- power consumption: 150W
- soldering temperature: 450°C

Additional supply:

- 2 spare soldering tips

2.1.10 Air Compressor, mobile

- 240V, 50Hz, IP44
- motor and thermal motor protection against overload
- fully-automatic operation via pressure switch, automatic pressure unloader and safety valve
- suction rate: 310ltr/min.
- tank capacity: 40ltr
- motor power: 1.5kW
- max. pressure: 10bar

Additional supply:
- 30m reinforced PVC-hose, inside diameter 13mm
- 2 air cleaner guns
- 1 spray gun with 1.6mm nozzle
- 50 hose clamps 12-20 mm
- 1 air pressure regulator with filter and water separator
- set of quick connections:
  8 pcs with outside threads
  8 pcs with inside threads
  8 pcs with hose connection
- 1 tyre inflator gauge 1-10 bar range

2.1.11 Steam-Cleaning Machine

Mobile high pressure cleaner, oil-heated and pump-driven, 415V, 50Hz, 5.8 kW
- hot water delivery: 430-850 ltr/h
- operating pressure: 30-170 bar
- temperature: 30-155°C
- tank capacity fuel: 25 ltr
- tank capacity chemicals: 20 ltr
- 3 rubber tyres, one or two of to be of swivel and brake type.

The supply shall include:
- 1 hand spray gun
- 1 jet pipe, length: 1m
- 4 HP-hoses, length: 10m
- 2 nozzle mouth pieces

2.2 Electric Measuring and Other Devices

2.2.1 Digital Multimeter

The digital display is integrated in the handle, according to VDE
- power supply: 9V
- AC/DC range: 0-1,000V
- S-range: 0-20K S
- accuracy: $\leq$ 0.5% ± 1 digit

Additional supply:
- transportation bag

2.2.2 Voltage Tester (Duspol)

- display range: 6-750V AC/DC
- LED display
- in leather case
- according to VDE

2.2.3 Multi-Tester

- AVO-meter AC/DC volt/ohm/ammeter
- fuse protected test leads
- alligator clips
- leather case
- according to VDE
- power supply: 1.5 V
- AC/DC range: 0-600V
- S-range: 0-10K S
- A-range: 0-3A

Additional supply:

- 1 set of test leads and tips

2.2.4 Battery Charger

- 240V, 50Hz, 20A
- charging current, capacity: 440VA
- switchover plug: 12V to 24V
- ampere-meter
- cut-out relay
- assisted take off 100A
- voltage display with a quick-charge device according to VDE

2.2.5 Battery Quick Charger

- charging voltage: 6, 12, 24, 36, 48V according to VDE
- charging current average:
  - 6V 50/75 A
  - 12V 100/150 A
  - 24V 75/122 A
  - 36V 50/75 A
  - 48V 35/52 A
- starting aid, average
  - 6V 320/480 A
  - 12V 380/570 A
  - 24V 330/500 A

Additional supply:
- ammeter
- change over switch charging voltage
- change over switch 0 - normal - rapid
- charging cables approx. 3m length including clips
- remote starting cable, approx. 4m length including push button tool tray with electric outlet socket

2.2.6 Car Light Tester

- light tester: 6-24V
- reversible blade with alligator clamp
- length: 33mm
- width: 3.5mm
- overall length: 125mm
- cable length: 750mm
- blade: chrome vanadium

2.2.7 Portable Engine Tester

Portable engine tester with analogue display suitable for two- and four-stroke engines with coil ignition systems, suitable for testing of speed, dwell angle and voltage, according to VDE.

- speed: 0-2,000 rpm
  0-10,000rpm
- dwell angle: 0-90
- resistance: 0-20 m Ohm
- no. of cylinders: 8
- test cable: 1.6m

Additional supply:
- leather bag

2.2.8 Portable Engine Tester

The portable and battery-operated combi-tester allows the principal engine function to be tested on conventional coil, breaker-triggered or breaker-less systems, allowing checks of engine speed, dwell angle, voltage and distance, according to VDE.

- measuring ranges:
  0-72° for 4-cylinder engines
  0-48° for 6-cylinder engines
  0-36° for 8-cylinder engines
- speed 0-1600 rev/min
  0-8000 rev/min
- resistance: 0-100 K-Ohm
- connecting cables

Additional supply:

- 1 dry battery 9V, type IEC GF 22

2.2.9 Timing Light Control

Timing light with analogue display scale of advance angle-meter and non-directional inductive pick-up, which controls the flash through the ignition spark of the first cylinder.

The timing light has a xenon lamp ensuring a highly visible flash even in a well-lighted room. The flash sequence is adjusted by a thumb wheel control in the handle until the moving firing point mark coincides with the fixed mark, simultaneously setting the pointer of the meter scale to show the advance angle in degrees.

The timing light allows for tests of the basic setting of the ignition distributor and the advance angle, centrifugal advance/retard, and vacuum advance/retard.

- according to VDE
- measuring scale: 0-60°

Additional supply:

- inductive pick-up clamp with connecting cable
- pair of connection cable with connecting clip

2.2.10 Compression Tester for Petrol Engine

- with shockproof manometer
- recording of up to 8 test results on a diagram sheet
- recording range: 3.5 - 17 bar
- no. of tests per card: 8

Additional supply:

- compression tester with recorder
- pair of connection cables
- extension hose with spark plug adapter
- 100 recording cards
- 3 replacement rubber adapters plus 3 extensions
- plastic box

2.2.11 Compression Tester for Diesel Engine

- with shockproof manometer
- recording of up to 8 test results on one diagram sheet
- recording range: 10 - 40 bar
- no. of tests per card: 8
- compression tester with recorder
- pair of connection cables
- 100 recording cards
- 3 different adapters
- plastic box

2.2.12 Small Parts Cleaner

- to be mounted directly on the container of the liquid
- working surface in one part
- grating of galvanised steel sheet
- operated by foot pedal with on/off switch
- cleaning brush
- operating height: 950 mm
- working space: 800 x 550 mm
- voltage: 240V

Additional supply:
- drum with 200 ltr rapid cold
- cleaner, odourless

2.2.13 Battery Service Kit

Battery service kit, in handy steel case with plastic insert, containing:
- 1 small metal saw
- 1 terminal brush
- 1 battery cell tester, 10-0-12V and 6-0-6V
- 1 cleaning brush
- 1 bulb filter
- 1 acid tester with float
- 1 spanner, 10 x 13 mm
- 1 water pump plier, length 250mm, capacity 40mm
- 1 screwdriver, flat, 150 x 6.5 mm
- 1 cleaning brush with plastic bristles
- 1 terminal puller
- 1 terminal reamer
- 1 battery carrying strap
- 1 plastic bottle with one rubber poorer, 2 ltr
- 1 cable cutting knife

2.2.14 Thickness Gauge

Set of 20 metal-feeler gauge sheets from 0.1 mm up to 2 mm in steps of 0.1 mm
- -length of sheet: 100 mm
- width of sheet: 13 mm

2.2.15 Thickness Gauge

Set of 20 metal-feeler gauge sheets from 0.1 mm up to 2 mm in steps of 0.1 mm
- length of sheet: 300 mm
- width of sheet: 13 mm

2.2.16 Speedometer

Mechanical speedometer set in a leather bag
- range of measuring: 0-10,000 1/min
- range of linear measuring: 0-1,000 m/min
- accuracy: ± 2 ‰

2.2.17 Thread Cam

Set of thread cams for inside and outside threads for ISO and Whitworth threads, DIN 13, 11, consisting of 52 pcs.

2.2.18 Thread Cam

A DIN-sheet for all theoretical measurements of ISO and Whitworth threads, DIN 13, 259, 103

2.3 Mechanical Tools

2.3.1 Drill Set

- HSS drill set, right hand cutting, according to DIN 338
- size: from 1 to 5 mm in 0.1 mm steps, 41 pcs

Additional supply:
- one metal box

2.3.2 Drill Set

- HSS drill set
- right-hand cutting
- according to DIN 338
- size: from 5.1 to 10 mm in 0.1 mm steps, 50 pcs

Additional supply:
- one metal box

2.3.3 Drill Set

- HSS drill set
- right-hand cutting
- according to DIN 338
- in metal box
- size: from 1-13 mm in 0.5 mm steps, 25 pcs

2.3.3a Drill Set

- HSSE drill set
- right-hand cutting
- according to DIN 338
- in a metal box
- size: from 1-13 mm, in 0.5 mm steps, 25 pcs

2.3.4 Counter Sink

- set of HSS
- TIN coated
- 90° counter-sink with cylindrical shaft
- in metal box
- sizes: 8, 10, 11.5, 15 mm

2.3.5 Reamer

- set of quick adjustment reamers, HSS
- hardened (Cr) cutting edges
- 11 pcs in wooden box
- size: 8 - 31.5 m

2.3.6 Reamer

- set of quick adjustment reamers, HSS
- hardened (Cr) cutting edges
- 13 pcs in wooden box
- size: 8 - 45 mm

2.3.7 Threading Tool Set, Taps and Dies

- set of HSSE ERGO dies for stainless steel
- ISO threads according to DIN 13
- size: M3 - M20; 3/3.5/4/5/6/8/10/12/14/16/18/20

Additional supply:
- wooden box
- cutting dies
- screw taps
- twisting pliers

2.3.8 Machine Taps

- set of heavy-duty machine taps, DIN 2182, HSS-E
- set of 14 pcs UNC taps with threads of 1-64 to 12-24 and 1/4"-20 to 1/2"-13
- set of 33 pcs UNF taps with threads of 0-80 to 12-28 and 1/4"-28 to 7/8"-14

2.3.9 Machine Taps

- set of 17 pcs of heavy-duty machine taps, DIN 376, HSS-E, Metric ISO, right hand cutting, from M3 to M33

2.3.10 Hydraulic Press

Hydraulic press with welded steel frame and electric driven pump unit, 415V, 50Hz, working platform adjustable, remote control unit

- overall height: 2,005 mm
- overall width: 1,180 mm
- depth: 1,000 mm
- max. pressure: 100 t
- lifting capacity: 150 mm

Additional supply:
- 4 different matrix tools

2.3.11 Chain Hoist

- chain of the hoist to be of Gall-type
- with automatic brake
- security hook not to break under over-tension (opening!)
- hand-lever operated
- capacity: 1,500 kg
- lifting height: 1,500 mm
- length of lever: 440 mm
- weight: 16 kg

2.3.12 Bench Vice

- front movable jaw
- unbreakable forged steel
- surface hardened
- painted in blue
- jaw width: 160 mm
- opening: 225 mm
- weight: 25 kg

2.3.13 Work Bench

- standard work bench
- with wood surface
- thickness: 50 mm
- base frame made of steel sheets
- 1 compartment
- 3 lockable metal drawers
- colour: RAL 6011
- length: 1,500 mm
- width: 700 mm
- height: 850 mm

2.3.14 Tool Box

Tool box of rigid steel sheet construction with different compartments

- length: 430 mm
- width: 200 mm
- height: 200 mm

2.3.15 Tool Cabinet

Steel cabinet with 3 drawers and 2 lockable doors, with tool holders

- height: 970 mm
- width: 650 mm
- depth: 250 mm

2.3.16 Steel Cabinet

- with 2 main doors, 3 inlet floors and 2 drawers
- height: 1,000 mm
- width: 1,000 mm
- depth: 500 mm
- colour: RAL 6011

2.3.17 Steel Cabinet

Cabinet with lockable sliding doors and 4 adjustable floors

- height: 1,950 mm
- width: 1,550 mm
- depth: 565 mm
- colour: RAL 7032

2.3.18 Hammer Set

- engineer's hammer
- German form
- ashwood handle
- work surfaces polished with safety claw wedge
- according to DIN 1041
- consisting of:

5 pcs	100 gr
5 pcs	300 gr
22 pcs	500 gr
5 pcs	1000 gr

2.3.19 Hammer Set

- sledge hammer
- German type
- ashwood handle
- according to DIN 1042
- consisting of:

2 pcs	3,000 gr
2 pcs	5,000 gr
2 pcs	8,000 gr

2.3.20 Mallets

- black mallets
- German type
- varnished hickory handle
- work surfaces polished
- according to DIN 6475
- consisting of:

2 pcs	1,000 gr
2 pcs	1,500 gr

2.3.21 Rubber Mallets

- barrel shape
- with ashwood handle
- hard quality
- approx. 90 shore A
- according to DIN 5128
- consisting of:

2 pcs	220 gr
2 pcs	590 gr

2.3.22 Chisel Set

- special Cr/Mo steel
- tempered head
- lacquered shank
- 1 octagonal flat chisel of 150x12x14 mm and 120x10x12mm each
- 1 octagonal cape chisel of 120x10x4 mm
- 1 drift punch of 150x12x4 and 120x10x3 mm each
- 1 centre punch of 120x10 mm
- 1 metal box with holders

2.3.23 Hand Scriber

- with exchangable, hardened tips of CrVa-steel
- with knurled handle
- size: 250 x 8 mm

2.3.24 File Set

Warding file set in metal box consisting of 6 pcs:
- 1 flat
- 1 half-round
- 1 round
- 1 square
- 1 three-square
- 1 barrette

Length of cut: 100 mm

2.3.25 File and Rasp Set

File and rasp set in plastic bag consisting of 5 pcs:
- 1 flat
- 1 half-round
- 1 round
- 1 three-square
- 1 half-round

Length of cut: 200 mm

2.3.26 Hand Hacksaw

- metal saw frame
- with adjustable handle
- similar to DIN 6473
- for saw blade length of 300 mm

2.3.27 Hacksaw Blades

- HSS-Bi-metal
- flexible blade
- length: 300 mm
- width: 13 mm
- pcs: 24

2.3.28 Double Ended Spanner Set

- open jawed spanners
- chrome-vanadium steel
- metric size
- 12 pcs of 6-32 mm
- according to DIN 3110

2.3.29 Double Ended Spanner Set

- open jawed spanners
- chrome-vanadium steel
- BS-size
- 12 pcs of 1/4 - 1.1/8"
- according to DIN 3110

2.3.30 Combination Spanner Set

- chrome-vanadium steel
- metric size
- 15 pcs of 6-32 mm
- according to DIN 3113B

2.3.31 Combination Spanner Set

- chrome-vanadium steel
- BS-size
- 20 pcs of 1/4 - 1.1/4"
- according to DIN 3113

2.3.32 Ring Spanner Set

- heavy-duty ring spanners with extension
- chrome-vanadium steel
- drop forged
- on blue metal display board with hooks
- 19 pcs of 24-85 mm
- extension 0, 1, 2, 3

2.3.33 Double Ring Spanner Set

- chrome-alloy steel
- deep offset
- chrome-plated
- double-hexagon
- according to DIN 838
- 12 pcs of 6-32 mm

2.3.33a Adjustable Wrench

- DIN 3117 B
- length 160 mm, 18 mm
- length 260 mm, 28 mm

2.3.34 Double Ring Spanner Set

- chrome-alloy steel
- deep offset
- chrome-plated
- double-hexagon
- according to DIN 838
- 10 pcs of 1/4 - 15/16"

2.3.35 Allen Key Set

- short-form Allen keys in a plastic wallet
- chrome-vanadium steel
- hardened nickel plated
- according to DIN 911
- 10 pcs of 2-14 mm

2.3.36 Strap Wrench

- with extra-long, non-slipping strap
- chrome-vanadium steel
- chrome plated
- range: 200 mm
- length: 285 mm

2.3.37 Nut Driver Set

- nut driver in chrome-vanadium steel
- hardened
- chrome-plated
- with exchangable T-handle
- 12 pcs of 4-13 mm
- length: 140 mm
- in plastic wallet

2.3.38 Torque Wrench Set

- with automatic release
- setting of torque by turning handle end
- direct reading on scale
- 1 range from 8-40 Nm in 5N steps
- 1 range from 40-200 Nm in 5N steps
- 1 range from 140-760 Nm in 10N steps

2.3.39 Tool Set for Mechanics

Tool set in plastic case, tools in chrome-vanadium steel, consisting of:
- combined ring and open jawed spanner set 7-19mm, 9 pcs
- one rim wrench, 17 x 19 mm
- combination plier, 165 mm length
- engineer's hammer, 300 gr
- chisel flat, length 150 mm
- 3 screw drivers:
  - 8 x 175 mm
  - 6 x 100 mm
  - 5.5 x 40 mm
- 2 cross slot screw drivers
  - PH 02
  - PH 2
- 2 small part containers
- 5 angled allen keys 3, 4, 5, 6, 8 mm
- 1 light tester 6-24 V
- 1 adjustable wrench, length 205 mm
- 1 adjustable tube wrench, length 200 mm
- 1 socket for spark plugs
- 1 sliding T-bar
- 1 universal joint, 73 mm
- 2 extensions 125 mm, 250 mm
- 1 reversible ratchet, length 265 mm
- 9 hexagonal sockets with 1/2" drive 10, 11, 12, 13, 14, 15, 17, 19, 22 mm

2.3.40 Screw Driver Set

- with hexagon collar
- chrome-vanadium steel

consisting of:
- 7 pcs slot screw driver 3.5, 4.5, 5.5, 7, 8, 10, 12 mm
- 6 pcs slot screw driver 4.5, 5.5, 7, 8 mm, cross slot screw driver, Ph1, Ph2

2.3.41 Plier Set

- pliers made of special tool steel, oil-hardened
- induction-hardened cutting edges
- PVC-coated handle
- according to DIN 5244

consisting of:
- combination plier, 180 mm
- side cutting plier, 160 mm
- telephone plier, 200 mm
- plastic case

2.3.42 Side Cutting Plier

- made of chrome-vanadium steel, oil-hardened
- induction-hardened cutting edges
- chrome plated
- according to DIN5238A
- length: 140 mm

2.3.43 Combination Plier

- for hard wires class H
- special vanadium steel
- chrome plated and polished
- according to DIN 5244
- length: 160 mm

2.3.44 Water Pump Plier

- plier made of chrome-vanadium steel
- painted red with sliding joint
- head polished
- according to DIN 5231D
- length: 240 mm

2.3.45 Vice Grip Wrench

- plier made of chrome-vanadium steel
- nickel plated
- length: 175mm/280 mm/240 mm
- opening: 25 mm/45 mm/32 mm

2.3.46 Crimping Terminal Assortment Set

Terminal assortments in metal box with crimping pliers for cutting and stripping.
- diameter gauge positioning, squeezing the insulation sleeve.
- one size of assortment: 3,750 pcs H0.5 - H4.0
- one size of assortment: 700 pcs H6.0 - H16

2.3.47 Cable Knife

- handle insulated up to 1,000V
- according to VDE
- with protection cap
- each one cutting length: 50 mm
- each one cutting length: curved 35 mm

2.3.48 Three Square Scraper

- chrome-vanadium steel
- with wooden handle
- according to DIN 8350 C
- length: 150 mm
- width: 10 mm

2.3.49 Square Scraper

- chrome-vanadium steel
- with wooden handle
- according to DIN 8350 A
- length: 150 mm
- width: 15 mm

2.3.50 Curved Scraper

- chrome-vanadium steel
- with wooden handle
- length: 200 mm
- width: 80 x 16

2.3.51 Hole Punch

- made of special tool steel, forged
- according to DIN 7200A
- in plastic wallet
- 12 pcs of 3, 5, 6, 8, 10, 12, 13, 14, 16, 19, 22, 25 mm

2.3.52 Stud Remover Set

- remover made of chrome-vanadium steel
- with left-hand thread for right-hand screws
- for screw diameters from 1.4 mm - 24 mm
- 8 pcs in plastic box

2.3.53 Extractor

Small extractor, 2 arms
- each one range up to: 60mm/80mm
- clamping depth: 50mm/80mm

2.3.54 Extractor

- with two sliding arms
- special tool steel, drop forged
- each one range up to: 120, 200, 350, 750mm
- clamping depth: 100, 150, 200, 400 - 700mm

2.3.55 Internal Ball-Bearing Extractor

- bearing inside puller set with two arms
- special tool steel, drop forged
- range of inside diameter: 12-70 mm
- set of 10 pcs in metal box

2.3.56 Separating and Pulling Device Set

- special tool steel
- 1 separator
- 1 pulling device
- 1 extension pair
- sheet metal case
- each one range up to: 60 mm/115 mm

2.3.57 Working Gloves for Welders

- 3 fingers
- leather
- according to DIN 4871

2.3.58 Rubber Gloves

- 5 fingers
- reinforced
- with cotton inlet
- according to DIN 4841

2.3.59 Safety Goggles

- full sight protection goggles for workers who wear spectacles
- according to K-DIN 234

2.3.60 Safety Welding Goggles

- with removable iternal glasses
- according to K-DIN 27

2.3.61 Pump Oiler

- with double-action pump and hostalen container
- size: 300 ml
- length of tube: 140 mm

2.3.62 High Pressure Grease Gun

- grease container mounted on a rubber-tired trolley
- foot lever-operated
- max. pressure: 400 bar
- content: 8 kg
- size: 810 x 250 x 400 mm (h, w, d)
- cmi per stroke: 2 cmi

Additional supply:
- 2.2 m high pressure hose
- high pressure handle
- nozzle tube
- set of nozzles and grease nipples in metal box

2.3.63 Barrel Pump

- hand-lever operated for oil and gasoline
- pump for standing barrels
- capacity: 30 ltr/min
- including hose set

2.3.64 Brush Set

Brush set with wooden handle consisting of:
- flat bush: 20, 25, 35, 50 mm
- round brush: size 2, 4, 6
- finish brush: size 10, 12, 16

2.3.65 Wire Brush

Steel wire brush, three rows
- length: 290 mm
- width: 30 mm

2.3.66 Wire Brush

Spark plug wire brush, four rows, wire made of brass
- length: 200 mm

2.3.67 Number Punch Set

Set of 10 punches in plastic box
- length of shank: 64 mm
- height of number: 3 mm, 0-9

2.3.68 Letter Punch Set

Set of 27 punches in plastic box
- length of shank: 72 mm
- height of alpha: 6 mm

2.3.69 Bumping Tool Set

In sheet metal box, consisting of:
- 2 different hammers
- 1 plastic hammer
- 4 bumping weights
- 1 flat chisel
- bending iron bar
- bending plier

2.3.70 Ratchet Wrench Set

- chrome-vanadium steel 31CrV3
- according to DIN 12,5/3120
- 19 sockets: 10-32 mm
- 1/2" ratchet
- extensions: 125mm, 250 mm
- universal joint
- sliding T-bar
- lever
- sheet metal box

2.3.71 Ratchet Wrench Set

- chrome-vanadium steel 31CrV3
- according to DIN 3120
- 19 sockets: 1/4" - 1.1/4"
- 1/2" ratchet
- extensions: 125mm, 250 mm
- universal joint
- sliding T-bar
- lever
- sheet metal box

2.3.72 Ratchet Wrench Set

- chrome-vanadium steel 31CrV3
- chrome plated
- according to 25 DIN 3120
- 1" ratchet
- extensions: 205mm, 405 mm
- sliding T-bar: 640 mm
- 10 pcs: 36 - 80 mm
- sheet metal box

2.3.73 Ratchet Wrench Set

- chrome-vanadium steel 31CrV3
- according to 25 DIN 3120
- 1" ratchet
- extensions: 205mm, 405 mm
- sliding T-bar: 640 mm
- 10 pcs: 1.1/2" - 3"

2.3.74 Cutting Wheels

For metal and stone, cold pressed, open structure

- max. speed: 80 m/s, medium hard wheel, straight version
- diameter: 125, 180 mm
- thickness: 3, 3 mm
- bore: 22, 22 mm
- max. speed: 12,000, 8,500 min-1

2.3.75 External Circlip Pliers

- set according to DIN 5254 B
- angled tips
- chrome-vanadium
- size: A01, A11, A31 and A41

2.3.76 External Circlip Pliers

- set according to DIN 5254 B
- straight tips
- chrome-vanadium
- size: A0, A1, A2 and A4

2.3.77 Internal Circlip Pliers

- set according to DIN 5256 C
- straight tips
- chrome-vanadium
- size: J1, J2, J3 and J4

2.3.78 Internal Circlip Pliers

- set according to DIN 5256 D
- angled tips
- chrome-vanadium
- size: J11, J21, J31 and J41

2.3.79 Tool Box for Electricians

- according to VDE
- including leather bag

  consisting of:
- Allen key set, 2 - 10 mm according to DIN911
- tip snip
- electrician's pocket knife
- cable cutter up to cable diameter of 10 mm
- hack saw, blade 140 mm
- phase tester 220-250 V
- engineer's hammer, 300 gr, according to DIN1041
- screw driver for cross slot screws according to DIN 5256
  - 2 x 100 mm: 2 pcs
  - 1 x 80mm: 2 pcs

- screw driver for slot screws, according to DIN 5265
  - 150 x 8.0 x 1.2 mm
  - 150 x 5.0 x 1 mm
  - 150 x 3.0 mm
  - 125 x 6.5 x 1.2 mm
  - 125 x 4.0 x 0.8 mm
  - 100 x 5.5 x 1.0 mm
  - 100 x 4.0 x 0.8 mm
  - 75 x 3.0 x 0.5 mm
- double-ended offset screw driver according to DIN 5200
  - for slot screws 100 x 4 mm
  - for cross screws 100 x 5 mm
- nut driver according to DIN 3125
  - 125 x 5.5 mm
  - 125 x 7.0 mm
  - 125 x 8.0 mm
  - 125 x 10.0 mm
- cable stripper
- folding rule 2.00 m
- cable strip plier according to VDE up to 1,000 V
- side cutting plier, length 160 mm, according to VDE up to 1,000 V
- telephone plier, length 210 mm, according to VDE up to 1,000 V
- telephone plier, length 160 mm, according to VDE up to 1,000 V
- combi plier, length 190 mm, according to DIN 5244 and VDE up to 1,000 V
- water pump plier, length 250 mm, according to DIN 3117 and VDE up to 1,000 V
- square blades awl, length 180 mm
- socket set, with hexagon sockets in painted steel box with 3/8" ratchet, sockets from universal joints, 2 extensions, tommy bar with sliding "T" according to DIN 3122/23
- multimeter AC/DC, A, V, , range: up to 1,000 V, aligator clips, leather case, fuse proof a shock-proof housing, transistor tester included, digital display, up to 20 A and 10 M..... supply 9 V, according to VDE

3. Bill of Quantities

3.1 Poti

Item	Description	Unit	Qty	Unit Cost	Total Cost
2.1	Electrical Workshop Machinery				
2.1.1	Electric Hand Drilling Machine	Pc	1		
2.1.2	Electric Hand Drilling Machine	Pc	2		
2.1.3	Electric Hand Drilling Machine	Pc	1		
2.1.4	Cable Reel, Steel	Pc	4		
2.1.5	Electric Angle Grinder	Pc	2		
2.1.6	Electric One-Hand Angle Grinder	Pc	2		
2.1.7	Bench Grinding Machine	Set	1		
2.1.8	Electric Soldering Tool	Set	1		
2.1.9	Electric Soldering Tool	Pc	1		
2.1.10	Air Compressor, mobile	Set	1		
2.1.11	Steam-Cleaning Machine	Set	1		
2.2	Electric Measuring and Other Devices				
2.2.1	Digital Multimeter	set	2		
2.2.2	Voltage Tester (Duspol)	set	3		
2.2.3	Multi-Tester	set	1		
2.2.4	Battery Charger	pc	3		
2.2.5	Battery Quick Charger	set	2		
2.2.6	Car Light Tester	pc	5		
2.2.7	Portable Engine Tester	set	2		
2.2.8	Portable Engine Tester	set	1		
2.2.9	Timing Light Control	set	1		
2.2.10	Compression Tester for Petrol Engine	set	1		
2.2.11	Compression Tester for Diesel	set	1		
2.2.12	Small Parts Cleaner	pc	1		
2.2.13	Battery Service Kit	set	2		
2.2.14	Thickness Gauge	pc	2		

Item	Description	Unit	Qty	Unit Cost	Total Cost
2.2.15	Thickness Gauge	pc	2		
2.2.16	Speedometer	set	1		
2.2.17	Thread Cam	set	2		
2.2.18	Thread Cam	set	2		
2.3	Mechanical Tools				
2.3.1	Drill Set	set	1		
2.3.2	Drill Set	set	1		
2.3.3	Drill Set	set	1		
2.3.3a	Drill Set	set	1		
2.3.4	Counter Sink	set	1		
2.3.5	Reamer	pc	1		
2.3.6	Reamer	set	1		
2.3.7	Threading Tool Set, Taps and Dies	set	1		
2.3.8	Machine Taps	set	1		
2.3.9	Machine Taps	set	1		
2.3.10	Hydraulic Press	set	1		
2.3.11	Chain Hoist	pc	2		
2.3.12	Bench Vice	pc	6		
2.3.13	Work Bench	pc	6		
2.3.14	Tool Box	pc	20		
2.3.15	Tool Cabinet	pc	1		
2.3.16	Steel Cabinet	pc	2		
2.3.17	Steel Cabinet	pc	2		
2.3.18	Hammer Set	set	1		
2.3.19	Hammer Set	set	1		
2.3.20	Mallets	set	1		
2.3.21	Rubber Mallets	set	1		
2.3.22	Chisel Set	set	5		
2.3.23	Hand Scriber	pc	5		
2.3.24	File Set	set	2		
2.3.25	File and Rasp Set	set	5		
2.3.26	Hand Hacksaw	pc	5		
2.3.27	Hacksaw Blades	pc	500		

Item	Description	Unit	Qty	Unit Cost	Total Cost
2.3.28	Double Ended Spanner Set	set	5		
2.3.29	Double Ended Spanner Set	set	5		
2.3.30	Combination Spanner Set	set	5		
2.3.31	Combination Spanner Set	set	5		
2.3.32	Ring Spanner Set	set	2		
2.3.33	Double Ring Spanner Set	set	2		
2.3.33a	Adjustable Wrench	set	3		
2.3.34	Double Ring Spanner Set	set	2		
2.3.35	Allen Key Set	set	5		
2.3.36	Strap Wrench	pc	2		
2.3.37	Nut Driver Set	pc	2		
2.3.38	Torque Wrench Set	set	1		
2.3.39	Tool Set for Mechanics	set	5		
2.3.40	Screw Driver Set	set	5		
2.3.41	Plier Set	set	5		
2.3.42	Side Cutting Plier	pc	5		
2.3.43	Combination Plier	pc	5		
2.3.44	Water Pump Plier	pc	5		
2.3.45	Vice Grip Wrench	set	4		
2.3.46	Crimping Terminal Assortment Set	set	2		
2.3.47	Cable Knife	set	5		
2.3.48	Three Square Scraper	pc	5		
2.3.49	Square Scraper	pc	5		
2.3.50	Curved Scraper	pc	5		
2.3.51	Hole Punch	set	1		
2.3.52	Stud Remover Set	set	1		
2.3.53	Extractor	set	2		
2.3.54	Extractor	set	2		
2.3.55	Internal Ball-Bearing Extractor	set	1		
2.3.56	Separating and Pulling Device Set	set	1		
2.3.57	Working Gloves for Welders	pair	20		
2.3.58	Rubber Gloves	pair	10		
2.3.59	Safety Goggles	pc	20		

Item	Description	Unit	Qty	Unit Cost	Total Cost
2.3.60	Safety Welding Goggles	pc	20		
2.3.61	Pump Oiler	pc	5		
2.3.62	High Pressure Grease Gun	set	1		
2.3.63	Barrel Pump	set	1		
2.3.64	Brush Set	set	5		
2.3.65	Wire Brush	pc	10		
2.3.66	Wire Brush	pc	5		
2.3.67	Number Punch Set	set	1		
2.3.68	Letter Punch Set	set	1		
2.3.69	Bumping Tool Set	set	1		
2.3.70	Ratchet Wrench Set	set	4		
2.3.71	Ratchet Wrench Set	set	1		
2.3.72	Ratchet Wrench Set	set	1		
2.3.73	Ratchet Wrench Set	set	1		
2.3.74	Cutting Wheels	set	50		
2.3.75	External Circlip Pliers	set	2		
2.3.76	External Circlip Pliers	set	2		
2.3.77	Internal Circlip Pliers	set	2		
2.3.78	Internal Circlip Pliers	set	2		
2.3.79	Tool Box for Electricians	set	4		
Total, FOB					
Sea freight to Batumi					
Insurance to Batumi					
Total, CIF Batumi					

Delivery Period to Batumi ..... weeks