

# **TECHNICAL SPECIFICATION FOR DIESEL POWERED FORKLIFT 8T**

**DCT Gdansk S.A.**  
**Deepwater Container Terminal Gdańsk**

Kontenerowa 7  
80-601, Gdansk  
Poland

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# I. OBLIGATORY SPECIFICATION

## 1 INTRODUCTION

The specification submits description of the main features of the Forklifts for container terminal. The offered Forklift, as well as all its mechanical and electrical components with the control system must fulfil the requirements or preferably - exceed them.

Every equipment which is offered must comply with the required expectations in a clear way or must be doubtlessly equivalent to the specified. If the same element is specified in few places of this specification - all demands are valid.

**If any equipment or features are indispensable for proper operation or maintenance of the Forklift and are not mentioned in this specification it is deemed this equipment or elements must be supplied with the Forklift.**

**The manufacturer of the Forklifts must have the experience gained over ten years in Forklift design business and delivered in this time over 100 Forklifts.**

If not specified differently an “experienced manufacturer” means that the specific products of the manufacturer were installed on at least 50 Forklifts within the last ten years.

## 2 DESIGN BASIS

### 2.1 Operation

The **FORKLIFT** must be able to work continuously in different cycles performing following tasks and also reverse processes:

- Take on the forks one standard ISO or EUR pallet with a cargo weighting not more than 8000 [kg] without extra staff and drive with it to the place of destination for putting the load away;

### 2.2 Environmental conditions

The Forklifts must be able to work in the local conditions present in Gdansk on the container terminal DCT Gdansk SA including air humidity, salt content in the air, air pollution, sand flight, snow and must be able to work with typical fuel, oils and liquids needed for normal operation available within this location.

Ambient Temperatures:	-25 [°C] up to +40 [°C]
Atmosphere:	Salty and dust-laden, including coal dust
Maximum relative humidity:	Up to 100%
Rainfalls /Snowfalls:	Occasionally heavy
Operation Wind Speed up to:	12 [m/s]

### 2.3 Design standards

The Forklift will be designed and built according to all European Union and Polish rules as well as all obliging standards and rules. The Forklift shall be designed in compliance with Directive 2006/42/EC and Quality Certification ISO 12100-1 and 12100-2.

All Forklift mechanisms like the engine, axles, transmission, brakes, motors, gearboxes, bearings, hydraulic with pumps and pipelines, cables, switches, sockets, plugs, cabin, etc. and other electrical or electronic equipment as well as other elements of the mechanisms and equipment-must be of European origin.

The origin is understood according to EC definition, which the core part is: *“In effect it means that goods must either (1) be manufactured from raw materials or components which have been grown or produced in the beneficiary country or, should that not be the case, (2) at least undergo a certain amount of working or processing in the beneficiary country. Such goods are considered to be >>originating<<.”*

The products can be also manufactured outside EU but by a company of EU origin and the manufacturer must have headquarter in EU for minimum five years. The products must fulfil all EU norms and standards. The Forklift should be designed in a way which eases maintenance. The transmission and all gearboxes should have easy access for oil replacement. All descriptions on control panels and maintenance places must be in Polish language. Quality management in accordance with ISO 9001 shall be implemented during designing and manufacturing. All equipment, electrical cables should be suitable for port and marine applications.

In general, design and construction must comply with all EN standards current at the date of contract. For aspects where no EN standard has been issued, appropriate ISO, European or American standards will be used.

### 3 DELIVERY AND ASSEMBLY

The Forklift shall be manufactured, fully assembled, commissioned and tested by the Supplier in the manufacturer's factory. After the delivery to the place of destination only minor assembly works are acceptable what should be limited up to 2 hours per one machine (on average), and shall be performed by the Supplier.

The Supplier shall bear all costs related to transportation, loading and unloading, permits for carriage by road and all charges for sea transport, etc. (if any). The Customer shall not bear any of the above-mentioned costs. The Supplier is obliged to provide additional slings, fasteners, hooks, etc. if it was required for safe unloading and assembly of the Forklift.

### 4 GENERAL REQUIREMENTS

The Forklift must be able to ride on slopes and platforms - slope minimum 20% with 80% of load at the speed of 2 km/h.

Maximum dimensions of the vehicle:

- |                                  |         |  |
|----------------------------------|---------|--|
| • Width:                         |         | 2.500 [mm]                                 |
| • Total height (folded mast):    |         | 3.000 [mm]                                 |
| • <b>Turning radius :</b>        |         | 3.800 [mm]                                 |
| • <b>Lifting capacity:</b>       |         | 8.000 [kg]                                 |
| • <b>Lifting/staking height:</b> | minimum | 7000 [mm]                                  |
| • <b>Forks length:</b>           |         | 1.600 [mm]                                 |
| • <b>Tilting angle F/R:</b>      | minimum | 5 [°]/7 [°]                                |
| • <b>Total weight (w/o):</b>     | maximum | 12000 [kg]                                 |
| • <b>Fuel tank capacity:</b>     | minimum | 130 [dm <sup>3</sup> ]                     |
| • <b>Driveline:</b>              |         | 4x2  |
| • <b>Transmission:</b>           |         | Automatic, fully compatibility with engine |

#### **Fire protection:**

Suitable fire extinguisher(s) will be provided acc. to EU and local authorities' requirements. The fire extinguisher shall be fixed to the structure body and its weight shall be about 6 [kg]. If there's not enough space inside cabin for 2 [kg] fire extinguisher - 2 [kg], dry powder, CO<sub>2</sub>, fixed outside operators' cabin in hard-shell PE case with latches (without access key), nearby access to operator's cabin.

## Bearings

The used bearings must be from an experienced manufacturer. All bearings must be standardized and have equivalents within a wide range of manufacturers.

There should be an ISO standardised bearings names in spare parts catalogue.

# 5 MAIN EQUIPMENT

## 5.1 Engine:

- **Engine:**
  - Type: straight, four cylinder diesel engine
  - Compression (optional): turbocharger with intercooler
  - Working range: 800 - 2500 [rpm]
  - Power at 2000 -2400 [rpm]: 60 - 90 [kW]

The Engine must be an economical Diesel type and must provide enough power and torque for operation.

Frequency of the maintenance routines for engine should be of min 500 working hours but the first inspection can be taken after shorter time.

The Engine must be delivered by “Experienced manufacturer” and shall be an economical Diesel type. The maintenance routines for engine should be not more often than every 500 working hours but the first inspection can be taken after shorter time.

Exhaust gas emission must meet the emissions standards applicable in EU and Poland on the day of delivery **and preferably, exceed them.**

After turning the ignition key into “ON” position, may or may not to occur a delay in ignition of engine, up to moment of completely warm-up of spark plugs. The process of warm-up of spark plugs could be signalled by through display the information on the dashboard or by buzzer.

After switched OFF the engine should keep running for time needed for cooling of the turbo charger or discharge pressure/ clean AdBlue system, flush other SCR systems (if necessary). There should be also easy access to engine oil dipstick along with refill nozzle.

## 5.2 Transmission

- Transmission shall be fully automatic and controlled electronically;
- Controlled via shifter mounted behind the steering wheel or dedicated lever nearby shifters for hydraulic;
- Minimum four gears forward, three reverse gears;
- Ability to set up maximum truck speed up to the value of 23-25 [km/h] without losing power, by means of the gear controller (when unloaded);
- The transmission shall be connected via the CAN-BUS (controller area network) interface, which optimises transmission performance and allows advanced diagnostic works;
- The gearbox control system must choose automatically and continuously between economical work and better performance. The choice must result from analyse both the slope, current load as well as other factors important in assessment of the fuel consumption;
- Intelligent economic drive program which detects if the operation is with or without load. Program shifts gears automatically up at lower engine revolution if there is none or reduced load detected;
- Integral, replaceable main elements and cooler filters;
- External warning buzzer switched automatically ON during reversing. Loudness shall be of 100 [dBA];
- Easy access to transmission oil dipstick and refill nozzle.

## 5.3 Axle

Both front and rear axles should be delivered from an experienced manufacturer.

The axles should be designed and designated for heavy operating conditions. Front axle

- Heavy duty drive axle;
- The driven axle must transfer 100% of normal operation torque;
- Equipped with wet disc brakes as described further;
- Equipped with differential mechanism, allowing normal operations of vehicle;

### **5.3.1 Rear axle**

Heavy duty steering axle with two way hydraulic cylinder. Turning radius of max. 3800 [mm].

## **5.4 Wheels**

### **5.4.1 Tires**

- Four front and two rear wheels;
- Industrial, pneumatic tires fit for purpose;
- Tires size: 8.25x15;

### **5.4.2 Rims**

- HD Steel rim;
- The mounting system must prevent self-undoing of the bolts to eliminate the need of periodical tightening.

## **5.5 Steering system**

Fully hydrostatic steering system with heavy-duty orbitrol valve and priority valve acting on the steering system. The system should include protection of steering emergency operation mode with cutting off of other hydraulic systems in situations of their failure.

The steering wheel must have a knob and be adjustable in both in/out and up/down direction.

## **5.6 Lifting mast**

The mast shall be heavy-duty, duplex or triplex type, for lifting and tilting. Mast has to be made with sturdy profile designed according to the free visibility principle. Lifting capacity of 8000 [kg] with centre of gravity on forks at minimum distance 900 [mm] from the edge of the carriage. There must be a controlled lowering of forks provided, in case of lifting system failure.

## **5.7 Carriage**

The carriage shall be equipped with hydraulic cylinders for forks positioning and sideshifting by dedicated shifters on operator panel.

It shall be equipped with forks  $l=1600$  [mm]. It shall be equipped with safety grid protecting the load from falling to the operator's cabin.

## **5.8 Brakes**

Front axle shall be equipped with wet-disc brakes.

Parking brake should be dry disc type, electrically controlled and automatically engaged when the engine is switched off. There shall be also an easy access for disc and brake lining for maintenance purpose.

While losing speed when braking, there should be gear/clutch disengage system, preventing transmission from damaging.

The service brake system shall be hydraulically operated with power assist.

The wheel brakes shall be functioning even when the engine stops.

## **5.9 Hydraulic system**

For lifting and steering purpose there shall be heavy-duty hydraulic system installed. Hydraulics shall be driven by the main engine, hydraulic pumps for steering, lifting and breaking directly mounted on the main engine or transmission, with priority valve or independent line for

the steering system. The pump shall provide minimum flow of 70 [dm<sup>3</sup>/min]. Hydraulic accumulator shall be installed in a lifting system. Hydraulic oil tank need to be fixed inside the chassis frame for additional crash protection. Tank capacity must be enough for operations with maximum lifting range. Working pressure range should be 150 [bar] - 250 [bar].

## **6 ADDITIONAL FITTINGS**

### **6.1 Warning signs and notices**

The warning signs must be located by manufacturer according to already mentioned rules as well as all EU requirements. The warning notices must be in Polish language.

### **6.2 Customer logo signs**

#### **6.2.1 Logo signs**

Supplier shall mark forklift by three customer signs located on sides of chassis, 150 [mm] x 150 [mm]. Forklift shall also have a terminal equipment ID numbers - numbering range will be given during contract sign-off. The numbers shall be of of 150 [mm] height, RAL9016, and resistant to road salt and normal car washing liquids. The location of the numbers on vehicles would be pointed on delivery.

There should be also a Manufacturers' name and logo on one side of mast.

#### **6.2.2 TDT registration numbers**

Supplier shall also paint TDT numbers (delivered by Customer after receiving registration numbers from TDT) on both sides of vehicle, according to drawing below. Colour and size should be the same as terminal equipment ID numbers.

### **6.3 Surface preparation for painting**

The surface preparation for painting of all raw steel materials shall be carried out in an automatic blasting machine or in specialised manual blasting hall.

The cleaned surface quality should be minimum as per Swedish Standard SA 2.5 with a surface profile. All fabricated box sections must be completely blast-cleaned in order to return the surface quality to SA 2.5, prior to application of the paint system.

#### **6.3.1 Painting**

The painting system shall consider at least three coats: primer, middle coat and finishing coat. The painting should be started immediately after the above mentioned shot-blasting process.

The total dry film thickness of the paint system is minimum **120 [µm]**

Main Structure Final Top Coat Colour shall be RAL 5005.

The technical guarantee on the painting coating applied on Forklifts body, frame, fenders, side covers, cabin, and rims should be 2 years or more, if specified in other documents.

Supplier must clearly mark on the structure support points for safe lifting by jacks. These marks should be painted RAL 1026.

#### **6.3.2 Platforms, steps, ladders**

Each surface, where people walk has to be anti-slippery.

All bolted-on platforms, stairs and ladders in the main entry system shall be "hot-dip-galvanised". The zinc coating shall be typically in excess of 70 [µm] thick. All bindings used in these areas, up to a size no less than M8 (bolts should be Metric), are of stainless steel – Grade A2-70.

#### **6.3.3 Mast**

Mast should be painted in RAL7021. On both sides of mast there should be "SWL XX TON" markings in RAL9016, 100 [mm] high –where "XX" is a lifting capacity of Forklift.



### 6.3.4 Counterweight

Counterweight should be painted in black/yellow strips (RAL9005/ RAL1026) – strips of 80 [mm] width at 45°. These strips shall be also painted on every protruding edges of counterweight (including side edges of upper counterweight).

## 6.4 Lifting system

Lifting system shall be based on heavy-duty hydraulic components, based on an experienced manufacturers' offer(s).

### 6.4.1 Mast

Shall be made of welded structure of rolled steel fit for purpose as a two or three-section telescopic with internal heavy-duty composite sliders between sections. Sliders/rollers shall be fully and easy adjustable or, in case of wearing out – replaceable.

### 6.4.2 Safety

If there and overload occurs, system shall prevent damaging or capsizing of vehicle by allowing only lowering of mast until any other move is safe. It must be accompanied with buzzer inside operator's cabin.

### 6.4.3 Load indicator

There shall be load measurement and indication system mounted on Forklift. System shall consist load display inside cabin – showing actual weight of cargo, calibrated in kilograms (mounted in a way that does not obscure operator view) and sensors on hydraulic system. Display shall be easy to operate and all descriptions shall be intuitive.

## 6.5 Operator's cabin

Forklift shall be delivered with cabin designed and made **directly by Forklift** manufacturer. Operator's cabin shall be designed to provide maximum visibility, low level of noise, excellent comfort and ergonomics for the driver. The structure of the cab of the vehicle should be welded cage made of steel for safety of the driver. The plating of the cabin shall be made of steel to increase resistance to mechanical damage and allow fast and cheap repairs. Cabin should be designed and built to meet the following requirements:

- Noise level inside the cabin max. 77 [dB] (A), measured in the distance of 200 [mm] from the driver's right ear at maximum revs.
- Noise level outside the cabin max. 87 [dB] (A), measured in the distance of 10 [m] from the side of the Forklift.
- comfortable driver's seat equipped with suspension. Seat should allow adjustment of the seat stiffness depending on the weight of the operator. The seat should dampen significantly vibrations caused by riding on uneven surfaces. The seat should have an adjustment in the direction up-and-down, front-and-back. The seatback should be adjusted to any angle;
- foldable armrests on the left and the right side of the seat;
- two-point seat belt. The belt must offer comfortable, easy and automatic loosening during normal operation if there are no excess deceleration;
- inside operator's cabin shall be a glove box or similar compartment for maintenance log book. The log book should of size width: 290 [mm], height: 170 [mm], depth: 25 [mm];
- the roof window must reflect sun rays and simultaneously enable observations of storage;
- windscreen washing liquid should be of capacity 3 [dm<sup>3</sup>] as a minimum with the washing liquid. The washing liquid tank shall be connected with pump via delivered hose. Replacement of the tank should be easy and simple;
- front window heated by fan blowing hot air ;
- wide panoramic back mirror in cabin of the Forklift;

- vehicle fitted with turn indicators on visible places on the sides of the vehicle. Turn signal light must be visible from the both front and rear side of the vehicle;
- cabin door fixed on hinges (not sliding), steel structure with glass window;
- door security lock opened with key;
- a protective overhead guard, designed in accordance to ANSI B56.1:2005 or EN ISO 3691-1:2015, shall be provided for the operator's cabin

## 6.6 Chassis

Welded structure shall be made of rolled steel, fit for purpose. The hydraulic tank and fuel tank shall have anti-collision protection and to be fixed to the chassis. The access steps will be integrated with the chassis and have anti-slip surface. The design of the vehicle must be proof to minor collisions.

Towing pin should be of the diameter 40-50 [mm] and will be located on the front and rear of chassis. The rear counter weight painted in yellow and black stripes.

The inlet and breathing pipes installed on the fuel tank should be suitable for the existing fuel station with refuelling pump of capacity 130 [l/min] minimum and nozzle type ZVA 25.41 and on it sensor of existing Hectronic system.

## 7 ELECTRICAL PART

### 7.1 General information

- 24 [V] DC negative earth;
- Alternator of 24 [V];
- Batteries 2x12 [V] / min.110 [Ah];
- Wiring with code numbers according to electrical drawings;
- All wiring with separate fuses;
- LOTO ready main power switch;
- "Latch" type interlock under rear counterweight (only when main power switch is set to "ON" position and interlock is latched, there is possibility for starting forklift). Interlock have to be pressed **every time** operator want to start forklift's engine.

### 7.2 Lighting

- LED white strobe light directed into rear of forklift, engaged when reversing;
  - LED headlights with dipped lights and long beam lights and LED turn indicators. It is also acceptable use of only single beam road front lights as long as they are of enough brightness and they are LED lights;
  - LED rear lights, LED turn indicator and LED stoplights mounted on vehicle counterweight;
  - LED reversing light of appropriate brightness and range with an external warning signal/ buzzer as described earlier;
  - Internal LED light inside the cabin;
  - LED beacon lamp on the back of mast, amber colour, starting after the main switch is ON. It shall have visibility of 360 [°];
- In general, according to ILO code of Practice OHS, all lights should be visible from 150 [m] on a clear night.**

#### 7.2.1 Electrical equipment in the driver's cabin

- Manual or automatic- type air conditioning unit which shall be sized to maintain internal cab temperature of 20 [°C] in all external ambient temperature conditions (as listed earlier). An adjustable thermostatic knob or switches shall be installed within reach of the operator, enabling safe and quick adjustment of temperature. Engaging of air

condition shall be performed via dedicated switch on operators' dashboard and cannot bring in with it any further operations;

- Adjustable cabin fan and heater;
- Two power cable with 12 [V], 10 [A] DC should be provided for installation place of IT equipment (as mentioned above). There should be a separate circuit from the fuse box with its own fuse;
- EMC display with intuitive information as described below;
- Load/weight indicator display;

### **7.3 Operator's dashboard - electrical equipment**

#### **7.3.1 Switches**

- Ignition switch;
- Operation lights on mast;
- Operation lights on vehicle;
- Road lights;
- Adjustment of cabin internal temperature (if applicable by switch);
- Adjustment of fan revolutions (if applicable by switch);
- Emergency lights;
- Emergency lowering, unless a different emergency lowering method is available.

#### **7.3.2 Indicator lights or graphic symbol**

- Turn indicator is activated;
- Lack of charging from alternator;
- Parking brake is enabled;
- Check engine;
- Check transmission;
- Road lights engaged;
- Operation lights engaged;
- Window wipers are engaged;

The graphic symbols must be intuitive and easily recognised by the operator. The digital codes are acceptable but it can't be the only information displayed on the dashboard. Each digital code must be accompanied by additional and intuitive information.

#### **7.3.3 Lamps or displayed information with buzzer warning**

- Transmission high temperature;
- Low oil pressure in engine;
- High engine temperature;
- Low pressure in hydraulic system;
- Lack of voltage from alternator;
- Parking brake is engaged;
- Low fuel level;
- Brake fault;

#### **7.3.4 Operator's dashboard**

With information about engine/transmission/hydraulic/pneumatic systems.

The panel should display information continuously, in metric units, when ignition key is ON:

- Engine RPM indication (when engine is ON);
- Engine working hours counter [MTH];
- Distance (millage) in kilometres [km];
- Speedometer;

- Gear direction;
- Engine oil temperature;
- Transmission oil temperature;
- Brake oil temperature;
- Current load [%];

## 7.4 Cameras with collision sensor

### 7.4.1 Reverse camera

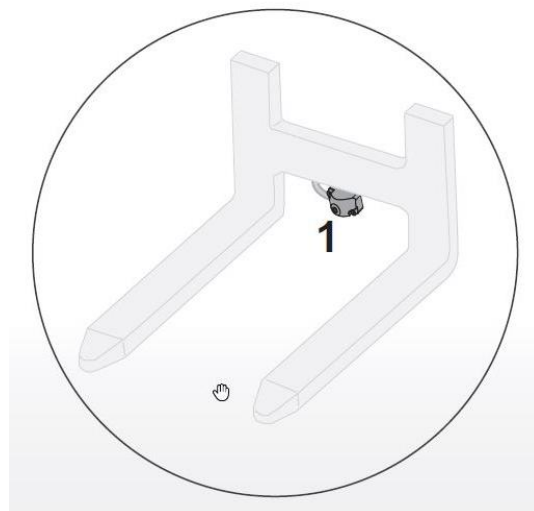
There should be 1 Full HD reverse camera mounted on counterweight, with working angle of min. 120 [°], allowing safe reversing of Reachstacker. It should be of sufficient IP protection and allowing night vision.

### 7.4.2 Reverse sensors

There should at least one reverse sensor mounted on counterweight, compatible with reversing camera. It shall have 3 working ranges: green (the furthest), orange (middle), red (the closest one) and be capable of detecting person of at least child size (about 1200 [mm] tall). Working angle should be of min. 140 [°] horizontal and 10 [°] vertical. If obstacle is detected, there should be acoustic signal of proper loudness and frequency engaged (from slow in furthest range to quick in closest one).

### 7.4.3 Carriage camera

There should be 1 camera located between forks, allowing safer positioning of forks. Camera should be of at least 50 [°] horizontal.



## 7.5 Rear Heavy Duty work light

- Heavy duty working light, aka. Bluepoint, dedicated for safety purpose shall be mounted on counterweight. It should be a Bluepoint or BlueArrow light which shows other operators that in specific area Forklift is working. Work light range should ensure a visible sharp-edged warning signal on the yard for an increased safety environment.

## 8 DIAGNOSTIC TOOLS

The Forklift should be equipped with diagnostic tools and/or PC (USB) interfaces that includes software for easy access to the devices installed on the Forklift, as a minimum:

- Diesel engine;
- Digital displays;
- Transmission/drives;
- Communication network parts.

The software allows to:

- Check all parameters;
- Calibrate transmission and other equipment;
- Maintain of the device;
- Read all fault codes;
- Regenerate SCR or DPF.

The manual and maintenance instruction must contain all access codes with their description and troubleshooting. If the software should be installed on PC laptop and installation version should be delivered on CD, DVD or memory stick with all licences.

**There should be at least one full set of diagnostic tools delivered, per one Forklift. Manufacturer shall also provide at least 4 user's accounts or provide access for at least 4 users into on-line spare parts catalogue and other on-line services.**

## 9 TECHNICAL DOCUMENTATION

A valid vehicle technical documentation shall be delivered at least 14 days prior to the delivery day of first batch of the Forklifts. The following documentation should be delivered in amount of one set of one order. Only individual licenses, codes and certificates should be delivered for each forklift separately.

- Instruction Manual for operator;
- Maintenance Instruction Manual, including calibration instruction of sensors and other equipment which could be adjusted (i.e. transmission, hydraulics);
- Workshop manual;
- CE certificate;
- Spare parts catalogue: list of all parts used on the FORKLIFT with drawings, descriptions and numbers of parts, including spare parts for: diesel engine, transmission, front axle;
- Technical main data sheets and machinery cards, including tolerances, acceptable wear and other needed data;
- Assembly drawings;
- Main components drawings;
- Electrical Diagrams;
- Electrical Instruction Manual;
- All error codes with description and suggested course of error removal.

Additionally suitable parts of documentation must include:

- Technical description;
- General drawing;
- Wiring diagrams, hydraulic and pneumatic diagrams;
- All diagrams of main drive systems and other existing drive systems (i.e. hydraulic).

Both documentation and Equipment must fulfil requirements of Polish rules regarding Forklifts with regard to amount and quality.

Drawings, diagrams, general assembly drawings should be provided in readable/printable PDF (at least ISO216 A1 format) or in readable/ printable **AutoCAD** format.

The above mentioned documentation must be delivered in one English and three Polish hard copies and two CDs or two USB memory sticks with unlimited possibility of printing. The Supplier shall equip the supplied equipment with all certificates and attestations required by Polish and/ or international law, appropriate for the type of the supplied equipment.

The documentation must contain complete information on operation, periodic technical inspections and a detailed specification of lubricants used by the manufacturer, including the exact name, viscosity, the standard met by them and quantity per particular subassemblies.

**If any other documents or certificates were not mentioned in this document but required by EU or Polish regulations or needed for correct maintenance or operation it shall be delivered upon request.**

## II. OPTIONS – SEPARATE QUOTE

### 1 TRAINING

#### 1.1 Maintenance training

A training for maintenance staff shall take place in DCT Gdansk and have to be performed in Polish language by experienced instructor. Instructor's resume, regarding his experience shall be provided prior to establishing dates of training. Training materials shall be provided prior to establishing dates of training.

Date of the training should be set with Maintenance Instructor minimum 30 days before each training session. The trainings are to be carried Monday – Saturday and should take place between 6AM – 2PM or 10AM – 6PM.

Trainings should be conducted after the commissioning of the FORKLIFT.

Before the commissioning of the delivery there must be finished training sessions in how to repair and maintain:

##### 1.1.1 The Forklift:

Minimum two electrical training days for two, 5 person group;  
Minimum two mechanical training days for two, 5 person group;  
The training shall be provided by the manufacturer of the Forklift.

##### 1.1.2 The transmission:

Minimum training days for two, 5 person group. The training shall be provided by the manufacturer of the transmission.

##### 1.1.3 The engine:

Minimum two training days for two, 5 person group. The training shall be provided by the manufacturer of the engine.

The dates of training sessions should not coincide.

#### 1.2 Operation training

Supplier of the equipment should provide trainings dedicated for at least 2 FORKLIFT operators.

- A.** Training for Operating Staff should be arranged in DCT Gdansk location and should be performed in Polish language;
- B.** Date of the training should be set with Operations Training Coordinator minimum 14 days before each training session;
- C.** The trainings are to be carried Monday – Saturday and should take place between 6AM – 2PM or 10AM – 6PM;
- D.** Trainings should be conducted after the commissioning of the FORKLIFTS;
- E.** Trainings should be carried by person who is fluent in FORKLIFT operations;
- F.** After training all participants should know how to:
  - a. Self-service the FORKLIFT and all the devices on it, required for everyday operation of the operator's position,
  - b. Be able to interpret the most common error messages / faults on the device,
  - c. Be able to handle all FORKLIFT systems supporting the operator's operation;
- G.** There should be 1 (driving course) training session conducted, for 2 operating instructors. Training should last minimum 2 hours.

## 2 SPARE PARTS LIST

### Cabin:

- safety belt for operator seat 2 sets;
- each type of switch 1 pcs;

### Engine

- each type of diesel sensors 1 pcs;
- alternator 1 pc;
- starter motor 1 pc;
- a set of gaskets 1 set for engine;
- V-belts with tensioning systems 1 full sets for one vehicle;
- Air condition compressor 1 pc;

### Automatic transmission

- each type of sensor 1 pcs;

### Hydraulics:

- priority valve 1 pcs;
- sealings for all hydraulic cylinders 1 set.

### Electric equipment:

- START/STOP button 2 pcs.

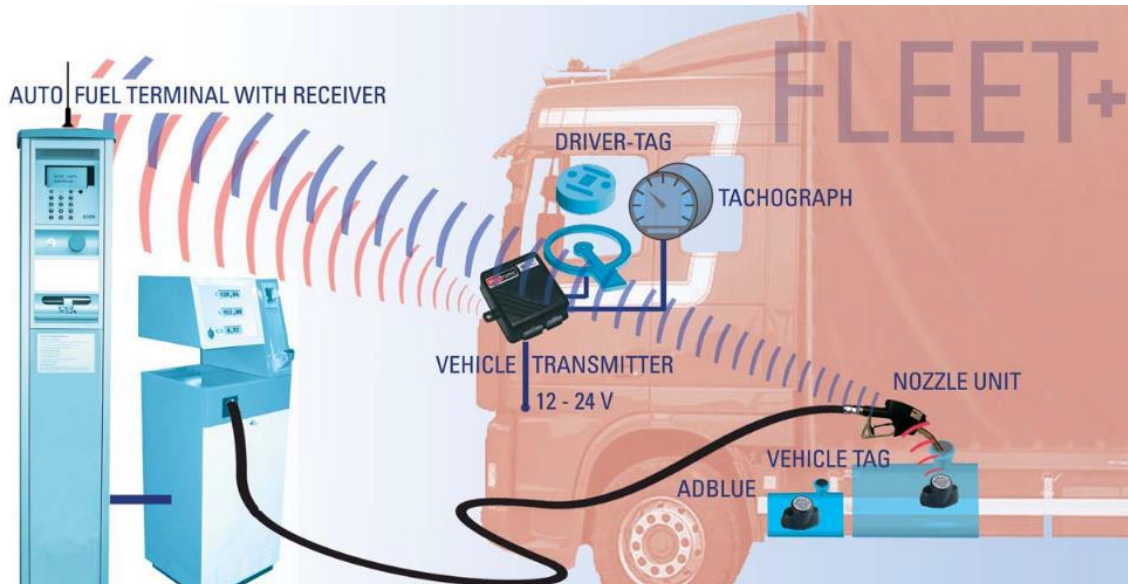
### Others

- One set of filters for performing 2000MTH check-up 1 set.

### 3 DATA RECORDING AND REPORTING

Sending data with FORKLIFT number, current working hours and distance (millage) in kilometers, when Forklift is refueled, to the "PETROPOINT FLEET+" delivered by HECTRONIC and installed on existing fuel station.

The vehicle must be equipped with individual Vehicle Tag (token) and Vehicle transmitter to transfer the amount of traveled kilometers and Hectronic MTH. The Buyer also accepts self-assembly of the system as long as Forklifts will be equipped with wiring needed for assembly.



Picture of the system overview (\*)

#### **Vehicle tag (\*)**

Cable-free passive transponder for installation on the vehicle tank inlet in conjunction with the PetroPoint nozzle unit (ATEX approval).

#### **Vehicle tag, Vehicle transmitter metal housing (\*)**

- 433MHz 12 / 24V - PetroPoint vehicle transmitter for the transfer of vehicle identification, driver identification, nozzle identification and kilometer reading.
- Transmission frequency 433 [MHz];
- Range approx. 20 [m] ;
- Operating voltage 9-16 [V] DC or 18-32 [V] DC ;
- Power consumption max. 200 [mA] during transmission;
- Temperature range -25 [°C] to +70 [°C];
- Operating hours integrated;

(\*) Source: 'PetroPoint. The Analyst.' by HECTRONIC; D-79848 Bonndorf