

Technical Specification No.**M-05-566****for the supply OF****Reachstacker 45 ton****Israel part number** _____ :**Manufacture part number** _____ :**Model** : new / renew / used / utex

Date	Function	Name	Signed	Version
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Appendix A3
M-05-566**Technical Specification for**
Reachstacker at east 45 ton**1. Intended Use**

- 1.1. The Reachstackers will be used for loading and unloading containers railways track operation in Ramat Hovav site in Israel Railways Authority Ltd. (**ISR**) in ISRAEL.
The Reachstackers will be used for handling **20'** and **40' ISO** containers using a telescopic spreader in confined areas with limited operating and narrow maneuvering space.
The Reachstackers will operate in hard operation conditions and dusty environments.
- 1.2. The drive line, electrical equipment, heat exchangers, expansion joints, etc., shall be designed to operate within a temperature range of **-10 °C** through **+50 °C** and relative humidity up to 60%.
Design Factors: Ambient temperature **50 °C**, Relative humidity **20%** to **60%**.
- 1.3. The Reachstackers chassis, structure, boom spreader, systems, engine, transmission, torque converter and drive axle with the planetary gear must be capable of withstanding the severe working conditions existing in the Ramat Hovav site.
- 1.4. All systems shall be capable of withstanding the changing of traveling direction without bringing the Reachstackers to a full stop.

2. Stability, Safety And Structure

The Reachstackers stability, safety and structure shall be according to Safety Industrial Trucks ISO 3691-1 and EN 16307-1, machinery directive 2006/42/EC, Safety Low & High Lift Trucks ANSI/ITSDF B56.1, Stability test Masted Container Handlers EN 10525, safety requirements of self-propelled variable-reach rough-terrain trucks EN 1459+A3, Industrial variable-reach trucks- Stability tests ISO 13562 (1 & 2), Visibility norm EN 13564, EN 13059 Noise level acc. to EN12053 inside the cabin, Noise level acc. to 2000/14/EC outside the cabin, Safety of industrial trucks - Test methods for measuring vibration EN 13059+A1 standards or equivalent standards to be approved by **ISR** at its sole discretion and Safety of industrial trucks - Electrical/electronic requirements 3.

- 2.1. The Reachstackers will have the CE marking.
- 2.2. The offered Reachstackers will meet all the requirements of the Israel Ministry of Transport for non-road mobile machinery.

3. **Attachment**

The Reachstackers shall be provided with the following attachment:

- 3.1. 20' - 40' Telescopic spreader for **ISO** container (see para. 5).
- 3.2. Integral side shift (see para. 7.4).
- 3.3. Spreader rotation (-95 / +185 degrees) (see para. 7.5).
- 3.4. Spreader side sloping (see para 7.6).
- 3.5. Spreader damping system (see para 7.7).
- 3.6. Four (4) lifting eyes on the four (4) corners of the spreader end beams for lifting general cargo.
- 3.7. Stabilizer system (see para. 4.1.4, 4.1.5, 4.1.6.3, 8, 9.2).

4. **Performance Characteristics**

4.1. **Reachstackers with stabilizer- Containers stacking**

Note: higher capacity shall be preferred.

4.1.1. Capacity - under SPREADER

- * **1st row** - load center - ~1,900 mm.
- * Lifting height, at least- **5 containers 9'6"**.
- * Not less than - **45,000 kg**.

Load center – distance from the front of the wheel to the center of the row (container).

Container stacking height – Five (5) ISO Containers of 9'6" height.

4.1.2. Capacity - under SPREADER (**Stabilizers up**)

- * **2nd row** - load center - 3,850 mm.
- * Lifting height, at least- **4 containers 9'6"**
- * Not less than - **34,000 kg**

4.1.3. Capacity - under SPREADER (**Stabilizers up**)

- * **3rd row** - load center - 6,400 mm.
- * Lifting height, at least- **3 containers 9'6"**
- * Not less than - **17,000 kg**.

4.1.4. Capacity with **Stabilizers down** - under SPREADER

- * **2ND ROW** - LOAD CENTER - 3,850 mm.
- * Lifting height, at least- **4 containers 9'6"**
- * Not less than - **38,000 Kg.**

4.1.5. Capacity **with Stabilizers down** - under SPREADER

- * **3RD row** - load center - 6,400 mm.
- * Lifting height, at least - **3 containers 9'6"**
- * Not less than - **24,000 Kg.**

4.1.6. **Rail tracks operation**

The Reachstackers shall be able to serve two (2) rail tracks from one side, with 20' - 40' fully loaded capacity container as follows:

(load center – distance from the front of the wheel to the center of the rail tracks)

4.1.6.1. Capacity - under SPREADER

- * **1st rail tracks** - load center - ~ 1,900 mm
- * Not less than - **45,000 kg**

4.1.6.2. Capacity - under SPREADER **stabilizers up**

- * **2nd rail tracks** - load center - 6,400 mm
- * Not less than - **17,000 kg**

4.1.6.3. Capacity with **stabilizers down** - under SPREADER

- * **2nd rail tracks** - load center - 6,400 mm
- * Not less than - **24,000 Kg**

4.2. **Speeds**

Maximum travel, lift & lowering (with load & without load) speed available to be offered.

5. **Dimensions**

The Reachstackers will be used for handling **20'** and **40' ISO** containers in confined areas with limited operating and maneuvering space.

Therefore, compact dimensions, minimum length, max wheelbase, maneuverability and minimum turning radius are required.

6. **Boom Construction and Lifting Height:**

- 6.1. Two (2) stage telescopic boom construction with one (1) extension cylinder and with two (2) lift cylinders mounted on both sides of the *RECHSTACKER*, connected to the boom to be designed for maximum lifting (**45,000 kg** in **1st** row) and maximum visibility. A telescopic boom and a spreader can Lift a **5 - ISO** Container 9'6" height.

A top mounting spreader should be provided.

6.2. **Boom**

The telescopic boom will be constructed of high-tensile steel and will be of the extra heavy-duty type. The number of welds will be a minimal as possible to ensure the highest possible tensile strength.

The telescopic boom will consist of the following:

- Outer (fixed) boom.
- Inner (extension) boom.
- Telescopic (extension) cylinder

Extractable (dismantling) telescopic (extension) cylinder without boom dismounting will be preferred.

7. **Telescopic Spreader**

A telescopic spreader that capable of handling **20' & 40' ISO** containers shall be provided.

7.1. **Structure**

The spreader should be built up to **45** tons, heavy-duty and rugged to sustain the heavy punishment of rough handling. The load center of gravity may be eccentric to the center of the 40' container up to one meter. The bottom of the spreader shall be reinforced and protected against operational damage.

The twist lock will be a pendular floating type.

7.2. **Component's Location**

The spreader should be built in such a way that all hydraulic and electrical components in its body to minimize operational damage. However, maintenance and accessibility should be easy.

Emphasis must be given to maintenance aspects in general and mainly to dismantling the twist locks, limit switches and hydraulic cylinders.

A solution should be provided to release or dismantle the twist locks when they are stuck in the container.

7.3. **Safety Features**

The SPREADER and the control panel shall have all necessary safety features and interlocks to ensure safe container handling, as follows:

- 7.3.1. Safe operation of twist locks (**T.L.**) to lock or unlock containers.
The twist locks (**T.L.**) will automatically close upon landing on the container.
- 7.3.2. Three indicator lights (red, orange, green) for spreader and twist lock position:
Red - Spreader without container - T.L unlocked.
Red and orange - Spreader seated on container and T.L unlocked (feeler pins retracted).
Orange and green - Spreader seated on container and T.L locked (feeler pins retracted).
Green - Spreader and container are lifted.
- 7.3.3. No engagement shall be allowed before all 4 **T.L.** are seated in the 4 corners of the container.
- 7.3.4. No disengagement shall be allowed when the container is suspended.
- 7.3.5. No lifting shall be allowed when all four twist locks are not fully locked or fully unlocked - all four twist locks are not fully open or fully closed.
- 7.3.6. At least double electric safety sensor and single hydraulic cylinder for two twist locks – on each SPREADER side.
Four (4) cylinders will be preferred.
- 7.3.7. No lowering shall be allowed when the **Spreader is seated on container** (4 **T.L.** are seated in 4 corners of container).

7.4. **Spreader Side Shift**

An integral side shift system shall be provided. The side shift movement should be at least +/-800 mm. The side shift cylinder shall be mounted in a protected location to protect the cylinders against operation damage.

7.5. **Spreader Rotation**

A spreader rotation system with two hydraulic motors shall be provided, allowing the spreader in closed position (20') and in fully extended position (40') to rotate at least - **105 / +185** degrees from the normal position.

A greater rotation degrees shall be preferred.

Traveling must be possible with fully loaded 20' containers when the container

longitudinal axis is perpendicular to the traveling axis and 20' container with at least 25,000 kg load when the container longitudinal axis is parallel to the direction of travel.

7.6. **Spreader Side Sloping – Tilting System**

A spreader-free tilting system (tilting /sideways mechanical articulation system) shall be provided enable the side sloping of the fully extended spreader to about **+4/- 4** degrees from its normal position.

The manufacturer shall propose a hydraulic control tilting system as an **option** (to be priced separately).

7.7. **Spreader Damping System**

Spreader damping system shall be provided.

A damping system with two cylinders will be preferred.

7.8. **Container Weighing System (under spreader)**

the Reachstackers shall be equipped with a container weighing system.

The system will provide accurate weights for containers loaded under the spreader, the load center-of-gravity position laterally and the load center distance from front wheels .

The Weighting data will be displayed for operators in real time.

System accuracy should be less than 2%.

A system with **sensors/load cells** in the T.Ls will be preferred.

8. **Stabilizer System**

A stabilizer system for increasing the load of not less than **24,000** kg on the **3rd row** (distance at least 6,400 mm) and not less than **38,000** on **2nd row** (distance at least 3,850 mm) shall be provided.

The system shall be extra heavy-duty type and rugged to sustain the heavy punishment of rough handling.

Articulated stabilizers will be preferred.

9. **Reachstacker safety features**

9.1. **Overload and over-tipping**

To prevent damage caused by overloading, the Reachstackers shall be equipped with an overload and over-tipping system.

The system shall automatically interrupt the lifting/or extensions of the boom motion in case an overload condition occurs.

If the condition mentioned is reached, the system shall enable the boom to retract to

eliminate the overload condition.

At least the following light indicators shall be provided;

- * Outreach overload.

- * Weight overload.

A load indicator color display shall be provided to show the operator the allowed safe load and actual load at the current boom lift or boom position.

9.2. **Stabilizer - Safety Features**

- * The stabilizer system shall be allowed to activate while the *REACHSTACKER* is **standing and steady position**.

- * No traveling (forward or reverse) shall be allowed when the stabilizers are down or not fully locked up.

- * Simultaneous stabilizer operation and boom extension/retraction shall be impossible.

- * Simultaneous stabilizers operation and traveling shall be impossible.

- * Hydraulic synchronization between the stabilizers (left & right) shall be provided.

- * The parameters of the overload system should be automatically adapted accordingly to the stabilizers status (stabilizers up or down).

- * The system (safe device) should prevent the stabilizers from hoisting up when the load is more than allowed.
Only retract and lifting movements shall be allowed.

- * Blocking valve shall be provided to prevent accidental stabilizers lifting in the event of hydraulic circuit failure.

- * The stabilizers will be fully articulated type for ease of operations and full ground contact to prevent any damage to the dock.
Articulate stabilizers will preferred.

- * Lifting and lowering time shall be less than 10 sec.

9.3. An electronic load safety system (lift and/or extension) shall be installed. The system will show the operator the allowed safe load and actual load at the current boom position with the following lights:

- * Green light - working in a safe condition.

* Yellow light with alarm – working from ~80%-90% of max. Load.

* Red light – max. load (~90%-100%) overload condition.

An electronic load safety system with a graph and a percentage value shall be accepted.

9.4. Simultaneous operation of traveling, lift, boom extension/retraction and spreader rotation will be possible.

9.5. Anti-Collision Function — Prevention of Spreader/Container Impact with the Cab

Synchronization shall be provided between boom lift/lower, boom extend/retract (out/in), spreader rotation, and the operator's cab fore/aft (F/B) position.

Spreader rotation shall be inhibited whenever the cab is not in the safe position.

9.6. Guarded, key-operated By-Pass switch(es) shall be installed in the cab to allow temporary override of control-system inhibits for Spreader and Boom movements (maintenance/recovery/emergency only). A visual indication shall be provided while active, and the function shall cancel upon key removal. By-Pass keys shall be keyed differently from the main/ignition key, held by the designated person responsible, and supplied with the complete delivery.

10. Drive lines

10.1. Engine: Diesel

10.1.1. The engine shall be equipped with six (6) cylinders, four-stroke inline, turbocharged, and high torque.

10.1.2. Diesel engines such as **Cummins, Caterpillar, Volvo, Mercedes**, or equivalent engines with **at least 250 kw (~335 hp)** and about **11-liter** displacement shall be offered.

Higher power, higher torque, higher displacement & low fuel consumption will be preferred.

10.1.3. The engine should have an electronic management control system, suitable for the Reachstackers according to our specifications and Exhaust Emissions according to EU **stage V** or **EPA Tier 4f for units produced in the USA**.

10.1.4. Engine Cooling

Rated for work in the tropical zone (see para. 1.2 for ambient temperatures), a water-cooled engine equipped with a coolant recovery bottle.

Higher coolant capacity will be preferred.

10.1.5. **Engine Air Inlet**

The engine air inlet shall be provided with a heavy-duty Turbo 2 air filter or equivalent and with heavy-duty double-stage multi-tube dry paper filter with an air restriction indicator DONALDSON type or equivalent.

Air Intake shall be at least 2,000 mm above ground level.

Intake to be as high as possible above ground level.

10.1.6. **Exhaust Pipe**

Exhaust pipe mounted in upswept position.

10.1.7. **Engine Oil Filter**

Full flow heavy-duty replaceable element type.

10.1.8. **Engine Protection System**

An engine automatic shut-off protection system or "crawl home" system shall be provided (the "Crawl Home" System should lower the engine RPM and the power).

The system will monitor at least the following functions:

- Engine - High coolant temperature.
- Engine - high oil temperature.
- Engine - low coolant level.
- engine - Low oil pressure.
- transmission - High oil temp.

10.2. **Transmission**

Automatic power shift with heavy-duty torque converter heavy-duty will be installed (see para.1.2 & 1.4). Transmission will be equipped with safety features to prevent starting of travel motion with load in high gear and including forward-reverse **shifting lockup**.

A hydrostatic drive system is not accepted.

10.2.1. **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. There will not be any connection between the transmission oil system and the hydraulic system.

Synthetic oil will be offered as an **option**.

11. Travel

11.1. Tires: Pneumatic, radial & Tubeless

Application: Industrial application.

Size: **18.00R 33** (≥ 214 at A5 /Load index at Speed symbol).

The manufacturer shall specify the tires.

The tires should be suitable for the max load, to the application, according to the ETRTO standards and international standards.

The tire compound shall be abrasion-resistant and the construction shall be heavy under tread.

Tires manufactured by Bridgestone, Michelin, Goodyear or equivalent shall be offered.

Maximum tire size available will be offered.

Option

Spare radial tire complete (wheel & rim) **18.00R33** as an **option**.

Six (6) Bias/Diagonal tires (**18.00 X 33 – 36 Ply**) shall be offered as an **option**.

Spare Bias/Diagonal tire complete (wheel & rim) **18.00R33** as an **option**.

Tire Pressure Monitoring System (TPMS) with a display inside the cabin shall be offered as an **option**.

11.2. Steer Axle and Steering Cylinder

The steering cylinder shall be a double acting double ended single cylinder and a fixed-length rod type, heavy duty and well protected (pivoting steer axle with dual steer cylinders is not acceptable).

Protection rings on the steering wheel nuts will be mounted.

11.2.1. Steering System

The steering system will be fully hydrostatic. The system shall permit dead engine steering according to international standards as mentioned in para. 2.

Electrohydraulic dead engine steering shall be offered as an **option**.

11.3. Drive Axle

Extra heavy-duty, wide axle (**>4,100 mm**) with planetary final dual drive.

Special care should be given to drive axle configuration, to withstand the working conditions described in para. 1.

11.4. **Service Brake**

Full hydraulic a wet multi-disc brake system in the drive axle will be provided.

An independent cooling system for brake oil will be mandatory.

11.5. **Parking Brakes**

11.5.1. Dry disc brake fitted ongoing shaft to the front drive axle or on the front drive axle.

11.5.2. The brake will be spring actuated, hydraulic release and control manually from inside the cab (switch or handle).

11.5.3. The parking brake will automatically be applied when pressure drops.

11.5.4. The transmission will change to neutral when the parking brake is applied.

12. **Hydraulic System**

12.1. All hydraulic components must be of a heavy-duty type and will be made of the highest quality steel. All cylinders are to be chrome plated.

12.2. All hydraulic hoses - fixed and flexible - will be well protected against operational damage. Flexible hoses to be as short as possible and easily replaceable.

12.3. The hydraulic system will be designed in such a way that the use of pipes and hoses will be reduced to a minimum.

12.4. A filter on the return line with restriction indicator and filter on delivery line shall be provided to protect the hydraulic System against pump failure.

12.5. Special FILTERS for the pressure line will be offered.

12.6. Joystick control shall be provided to control all Reachstackers systems and attachments (see para. 1.5).

12.7. Hydraulic oil shall be specified by the manufacturer.

13. **Fuel System**

High-capacity fuel tank to be provided.

Double-stage fuel filter:

13.1. First stage - sediment bowl.

13.2. Second stage - replaceable cartridge.

13.3. A Start/stop function to save fuel shall be offered as an **option**.

14. **Electrical System**

- 14.1. Heavy-duty alternator, 24 volts & at least 110 amps.
- 14.2. Battery at least 110 amp/hr, maintenance-free type.
- 14.3. All electric components to be heavy-duty and rated for 24-volt operation.
- 14.4. A circuit breaker will be installed.
- 14.5. Fuses and relays will be mounded in a central electrical box.
- 14.6. **A CAN-BUS** system will be included. Redundant CAN-BUS system shall be preferred.
- 14.7. TELE SERVICE AND MONITORING – **OPTION**.

The system shall allow connectivity from the manufacturer factory to each *RECHSTACKER* in order to check the correct functioning. In the event of any malfunction, it will be possible to identify the problem and fix and adjust the system accordingly.

The **option** will be priced separately.

- 14.8. *RECHSTACKER* software for management, maintenance, adjustments and calibration work - complete with all its accessories & connections for linkage to both a laptop and two PC working stations - should be included.

15. **Driver Cab, Controls and Instruments**

- 15.1. An enclosed operator cab with overhead guard, in compliance with DIN 15165, ISO 6055, ANSI B56.1 or an equivalent internationally recognized standards shall be provided.
- 15.2. The cab shall be located in the central position to enable good visibility of the stacking containers. The cab shall be protected by two lifting cylinders at its sides and a boom at its top.
- 15.3. The cab shall be provided with a horizontal panoramic windshield (one complete glass without any vertical divisions, joints or connections, providing a wider field of vision to the sides) extending continuously from the left door frame to the right door frame with no side glass.

The two side doors shall be with sliding windows. The rear windows should be designed to open manually or by using an emergency hammer for emergency exit only. All windows will be made of tinted safety glass and as follows:

- 15.3.1. The front window shall be Toughened (tempered), tinted safety glass with a thickness of about ~ 6 mm.

- Tinted Laminated safety glass shall be offered - **Option**.

15.3.2. The rear window will be made of Toughened (tempered), tinted safety glass.

- Tinted laminated glass shall be offered - **option**.

15.3.3. The top window will be made of Toughened (tempered), tinted safety glass.

- Tinted laminated safety glass shall be offered - **option**.
- Tinted polycarbonate with anti-sun reflection shall be offered - **Option**.

15.3.4. The sides (doors) windows will be made of Toughened (tempered), tinted safety glass.

- Tinted Laminated glass shall be offered - **Option**.

Note to sections 11.2.1 TO 11.2.4:

The tinted glass shall comply with European regulation ECE R43, ensuring a minimum Visible Light Transmission (VLT) of 70% for the front windshield and meeting all applicable safety standards for other windows.

15.3.5. • Wipers (interval) and washers will be installed on the front, rear and roof windows.

15.4. The cab shall be provided with sound and heat insulation. Extra insulation should also be between the cab and the engine.

The cab shall be mounted on rubber elements to ensure a low level of vibration in the operator's cabin.

Great care shall be given to the operator's **visibility** (front, rear and sides). The Reachstackers should be designed to allow high **visibility** even with boom fully lifted. The front and rear windows should be large to ensure unobstructed front & back visibility.

A large cab would be preferred.

15.5. **Sliding Cabin**

A hydraulic sliding cabin forward and backward shall be provided (stroke >2,300 mm).

Cabin shall slide to fully forward as much as possible.

Longer strokes shall be preferred.

A minimum distance from the front of the Reachstacker to the cab in the front position will be preferred.

15.6. **Sound Level**

The sound level at the operator's ears with a closed cab shall not exceed **76 dB(A)** in

accordance with **EN 12053** standard and external sound shall not exceed **110 dB(A)** in accordance with EU noise Directive **2000/14/EC** or equivalent standards to be approved by **ISR**.

The manufacturer will attach data regarding the noise level of the equipment offered to his proposal.

A lower sound level at the operator's ears with a closed cab to be preferred.

Extra sound insulation - reduction of at least 3 dB(A) will be offered as an **option**.

15.7. Air Conditioner

The air conditioner unit incorporates a heating system installed inside the cab. The refrigerant shall be type R134a.

At the ambient temperature described in para. 1, the cab temperature should reach 18 °C. All components must be HD-suited for automotive equipment.

A high cooling capacity (KW or BTU) shall be preferred.

- 15.8.** A fully adjustable, full suspension (mechanical spring) seat with a heavy-duty fabric cover with a high back, adjustable armrest (RHS) three-points safety belt and operator presence system (see para 15.23).

ISRI seat or equivalent shall be preferred.

one additional folding seat with a seat belt shall be provided.

- 15.9.** The following controls shall be provided:

15.9.1. Two brake pedals on right and left side of steering column or Combined Brake/Inching Pedal.

15.9.2. Throttle.

15.9.3. Power shift selector.

15.9.4. Forward/reverse motion control.

15.9.5. Boom raise/lower control.

15.9.6. Booms extend/retract control.

15.9.7. Side shift control.

15.9.8. Spreader rotation control.

The control shall act via a joystick handle with a securely held switch.

15.9.9. Spreader operation controls and indicators.

15.10. Hydraulic system motion controls

All controls will be located in such a way as to assure smooth, easy and safe operation.

Control handles para 15.9.5 to para 15.9.9 to be mounted on the right side of the steering wheel.

15.11. Indicators

At least the following indicators or display shall be provided:

Hour meter, voltmeter, engine coolant temp, fuel gauge, engine oil pressure gauge, transmission oil pressure gauge and transmission oil temperature gauge.

15.12. Warning Lights

At least the following warning lights shall be provided:

Low brake pressure, low engine oil pressure, low transmission oil pressure, high transmission oil temperature & alternator (including warning signal).

15.13. A reverse gear shifting lock-out should be provided (see para 10.6).

15.14. A heater/demister and fresh air ventilator shall be provided.

15.15. **Traveling And Working Lights** (the lights shall be operated automatically at engine starting) (All lights should be LED type):

15.15.1. Two (2) working lights on spreader.

15.15.2. Two (2) working lights on boom.

15.15.3. Forward and reverse traveling lights.

15.15.4. Tail, stop, reversing lights and turn signals lights.

15.15.5. 2 working lights on the front edge of the cabin.

15.15.6. 2 Rotating amber light - boom mounted (one on each side of boom).

15.15.7. Reverse warning alarm, with flashing red lights.

15.15.8. Additional working lights **as an option**:

15.15.8.1. 2 working lights on the front edge of the cabin.

15.15.8.2. 2 working lights on the rear edge of the cabin.

15.15.8.3. Extra Two (2) working lights on a boom.

15.15.8.4. Extra Two (2) working lights on fender, Directed to 20' / 40' spreader.

15.15.8.5. Extra Two (2) working lights on spreader.

15.16. A radio with BT, USB, antenna, 2 speakers and a 24V power supply will be provided.

15.17. Public Address System (Cpa) – Option (To Be Priced Separately)

A public address (PA) system of model PA300 manufactured by Federal Signal Corporation, or equivalent, shall be offered.

The system shall be a heavy-duty, 24-volt unit with an output power of 100 watts RMS, and shall be protected against vibration.

15.18. **A support bar** for equipment installation (Computer or communication equipment) should be in the cab at the RHS.

15.19. 2 units of sockets 12 Volt DC & 2 units of sockets 24 DC volt to use accessory.

15.20. Front and rear windows should be equipped with rollable or raiseable sun visors.

15.21. Rear view mirrors inside the cab and two on the front fenders.

15.22. Automatic engine shutdown after 5 minutes (can be adjustable) in idle mode (when operator leaves his seat or no activity of the Reachstacker) shall be installed - **option**.

15.23. **One Rear TV camera & one-color monitor (7")**

The Reachstackers should be provided with one close-circuit TV rear camera systems with one color monitor (7"). The system should give the operator a clear view while reversing. For safety operation, the angle of the rear horizontal sight should be as large as possible.

15.24. **Two front view cameras – Option**

The front camera should be pointed at the twist locks on the spreader.

15.25. **Rear ultrasonic warning/Personal proximity warning system**

Ultrasonic systems will be offered as an **option**. The system will alert if the REACHSTACKER approaches objects, people, or anything else. The rear cover area will be at least 110 degrees. The warning will be audible. The system will include an option (if it possible) to identify a person using a suitable app on the mobile phone.

15.26. The revers warning system includes at least 4 sensors as an **option**.

16. **Grease**

The RS shall be greased in accordance with the manufacturer's specifications, or with an equivalent grease subject to the manufacturer's approval.

The grease should be implied by two, three or four (at least the boom and the steering system) centralized greasing points (one single greasing point with multiple heads will grease some bearings or other greasing points).

Central Automatic Lubrication Systems – two independent systems will be installed in the RS. one system for the spreader and one for frame and steering (General layout drawing will be added).

The manufacturer shall propose Central automatic Lubrication progressive systems.

The System should be LINCOLN QUICKLUB or equivalent.

17. Details of the Reachstackers structure, dimensions and strength must be submitted, as well as brochures and full technical specifications.

18. The Reachstackers shall be equipped with a complete fire suppression package, as follows:

- * An automatic fire suppression system shall be installed in the engine compartment.

The system shall be of a reputable and proven type, such as **FOGMAKER**, **Dafo**, or an equivalent system that provides at least the same level of protection and performance.

- * Fire extinguisher

A portable fire extinguisher shall be supplied. The type, capacity, and installation location shall be specified and approved by the manufacturer.

19. **Paint**

Standard manufacturer scheme.

Note: The paint system shall be at least according to ISO 12944 and at least **C2** or equivalent. Greater than **C2** will be preferred.

- 19.1. Paint system according to ISO 12944 and at least **C3** or other equivalent standards shall be offered as an **option**

20. **Quality Assurance and Quality Control**

- 20.1. The manufacturer's quality control system should follow **ISO 9001:2015** guidelines or corresponding quality standards approved by **ISR**.

The manufacturer shall submit a certificate issued by an independent organization showing that he meets **ISO 9001:2015** requirements or corresponding quality standards.

- 20.2. The final test shall be conducted at the manufacturer's plant with the **ISR** representative – option. The test report will be submitted to **ISR**.

21. **Final Adjustment and Testing**

The manufacturer shall submit a full testing program for **ISR**'s approval. The program shall be detailed and shall include at minimum the following:

- * Content of test.
- * Required characteristics and result data.
- * Method of conducting control and measuring.

The final test shall be conducted at the manufacturing plant with or without the **ISR** representatives. The test report shall be submitted to **ISR**.

22. **Safety Arrangements**

- 22.1. The general assembly and detailed design of the Reachstackers shall conform to the safety regulations and codes.
- 22.2. All nuts, connecting structural parts, moving and rotating parts (couplings, drums, sheaves, etc.) shall be self-locking type to prevent their loosening due to vibration.
- 22.3. All exposed rotating parts shall be provided with rigid safety guards.
- 22.4. Unavoidable hazardous points shall be marked with a special warning paint (yellow and black stripes) and with appropriate signs in Hebrew.
- 22.5. Walking surfaces must be coated with anti-slip paint.

23. **Maintenance**

- 23.1. Easy access shall be provided to enable the performance of all daily maintenance checkout and liquids replenishment tasks without the necessity to dismantle obstructing components.
- 23.2. One maintenance kit including all filters & belts up to 3,000 w/hr shall be offered – **Option.**

24. **Acceptance Test Criteria**

- 24.1. Acceptance tests for the Reachstacker shall be carried out on the basis of the DS (Data Sheet) forms, as completed, signed, and submitted by the Bidder as an integral part of its bid. These tests are intended to verify that each Reachstacker supplied fully complies with all data, requirements, characteristics, and performance parameters declared in the DS, as well as with the requirements of the technical specification and the contract.
- 24.2. The acceptance tests shall include verification of technical and operational data, including: lifting capacity, engine power, front axle width, wheelbase, noise level in the operator's cab, overall dimensions, Reachstacker weights, load distribution, travel speed, lifting height, mast tilt forward and backward, inner and outer turning radius, lifting speed, lowering speed, and any other data included in the DS.
- 24.3. Any deviation, discrepancy, or failure to comply with one or more of the data or performance parameters declared in the DS and required under the tender documents shall be deemed a failure to pass the acceptance tests. In such case, the Supplier shall, at its sole expense, perform all repairs, adjustments, completions, or replacements

required, and shall resubmit the Reachstacker for repeat testing until the ISR confirms that all requirements have been fully met.

SLA

1. SLA during the warranty period

- 1.1. In the event of a faulty or broken part, the proposer must replace the part under warranty.
- 1.2. Fault reporting service – 24/7, 7 days a week. Answering via staffed stations or automatic recording.
- 1.3. Since the difficulty in transporting FLT32 ton, FLT38 ton and Reachstackers on the roads, the supplier must have a means of transportation and the ability to repair faults, perform preventive maintenance and Predictive maintenance within the ISR sites.
- 1.4. During the warranty period, the proposer shall conduct maintenance according to the manufacturer's instructions, depending on engine hours and the technical experience of Israel Railways (ISR).
- 1.5. All parts/replacements must be original and conform to the original manufacturer's spare parts catalog or parts manual.
- 1.6. The proposer must provide services to all sites where the FLT32 ton or FLT 38 ton or Reachstackers will be located.
- 1.7. The Proposer must submit a monthly performance report to ISR, including at least the following details:
 - 1.7.1. Number of days and hours of FLT out-of-service fault
 - 1.7.2. Description of the Fault
 - 1.7.3. Downtime each fault
 - 1.7.4. Spare parts replacement list
 - 1.7.5. Monthly downtime duration
 - 1.7.6. Planned preventive maintenance
 - 1.7.7. preventive maintenance performed
 - 1.7.8. Planned Predictive maintenance
 - 1.7.9. Predictive maintenance performed

2. Schedule of Penalties:

Fault Type	Target SLA	Definition	Penalty Amount
Critical Fault (Breakdown Fault)	On-site arrival within 5 hours	Arrival of a technician/representative On-site from the time of reporting	250 NIS for each hour of delay
Non-Critical Fault (non-breakdown fault)	On-site arrival within 8 hours	Arrival of a technician/representative On-site from the time of reporting.	200 NIS for each hour of delay
Critical Fault (Breakdown fault)	Repair within 24 hours	Full restoration of system operations	600 NIS for each day of delay
Non-Critical Fault (Non- breakdown fault)	Repair within 48 hours	Full restoration of system operations.	400 NIS for each day of delay
Supply and repair of imported spare parts	Supplier to provide an estimated schedule including repair time (price quote).	Full restoration of system operations.	300 NIS for each day of delay

3. Response and Repair Times:

3.1. Response times for handling critical faults (FLT's and Reachstackers out of service) that prevent the FLT's (32 and 38 ton) and Reachstackers from operating:

3.1.1. Arrival time for repair: Within **5** hours from reporting.

3.1.2. Fault repair completion: Within **24** hours of technician arrival on-site.

3.1.3. If a part or component for FLT 32 ton, FLT 38 ton, or Reachstackers must be imported from abroad while the equipment is under warranty, the supplier must provide an estimated arrival time for the part and an estimated timeframe for resolving the fault.

In the event of a delay beyond the specified timeframes, the Supplier shall be subject to penalties in accordance with the table in section 2 above.

3.2. Response times for handling non-critical faults (FLT 32 ton/38 ton and Reachstacker in service) that do not prevent the equipment from operating:

3.2.1. Arrival time for repair: Within **8** hours from reporting.

3.2.2. Fault repair completion: Within **48** hours of technician arrival on-site.

3.2.3. In the event of a delay beyond the specified timeframes, the Supplier shall be subject to penalties in accordance with the table in section 2 above.

4. After repair or maintenance tasks, the supplier must clean the work area and remove all equipment, tools, rags, jerry cans, oils etc. from the railway site.

5. Maintenance:

5.1. Preventive Maintenance:

5.1.1. Preventive maintenance will be performed according to the manufacturer's instructions .

5.1.2. As part of the preventive maintenance, all engine components, the hydraulic system, the brakes, the tires and the electrical systems will be checked according to the manufacturer's instructions.

5.1.3. Upon completion of each service, a detailed report of the inspections and maintenance performed shall be submitted to the ISR.

5.2. Predictive Maintenance:

5.2.1. Maintenance will be performed using oils tests, and other tools for the manufacturer's instructions .

5.3. Spare parts availability

5.3.1. The availability of critical spare parts will be ensured within a maximum of **48** hours for urgent orders.

5.3.2. The supplier shall commit to maintaining a minimum stock of critical spare parts in accordance with the manufacturer's instructions and subject to the approval and instructions of a technical representative of the railway (ISR). The stock shall be stored in a local or regional warehouse.

6. **Operator/User Training:**

6.1. The supplier will commit to training the operating teams .

6.2. The supplier will provide instruction manuals.

7. Control and Reporting:

7.1. The supplier will provide a control and reporting system (online technician/customer manager) to monitor service calls and response times.

7.2. A monthly performance report will be submitted to the ISR and will include statistics on repair times, recurring faults, and future maintenance plans.

7.3. SLA service during Optional Period.

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