



Section I

Technical Specifications
for

Electro-Hydraulic "Orange Peel" Grab

for
Gottwald GHMK 3406 mobile crane

**Haifa Port Company Ltd
(HPC)**

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TABLE OF CONTENTS

	Subject
1.	General
2.	Crane characteristics
3.	Operation
4.	Design Criteria / Design
5.	Shop work
6.	Final test and acceptance
7.	Warranty period
8.	Safety regulations
9.	Quality Control

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1. **General**

The grab is intended to handle Steel Scrap Materials (HMS 1/2).

Length when grab is fully open shall be 4500mm max.

Grab capacity shall **not** be less than 5 m³.

Grab design is to be of the Heavy-Duty type to sustain the hard working conditions of "port scrap handling".

1.1 **Scope of work**

The following specifications together with the data sheets forms, extracts of bidding items and the appendices represent the requirements for the supply of an electro hydraulic Orange Peel Grab, design, fabrication, testing and warranty of the grab.

The manufacturer shall furnish all appliances and/or accessories that are necessary for the proper performance of the grab, whether detailed or not in the drawings, called for in the specifications, or shown on the data sheet.

The grabs shall be connected to the crane via rotating connecting hook (not part of the supply) at HAIFA PORT COMPANY LTD (HPC).

1.2 **Climate and meteorology**

Climate at the operation site is characterized by a typically Mediterranean sub-tropical climate. The mean annual temp. is 22°C, the coldest months are Jan. and Feb. (mean daily temperature of 16°C) and the warmest month is Aug. (mean daily temperature of 27°C).

Relative humidity values are relatively constant throughout the years with monthly averages ranging from 57% to 69%.

All the equipment shall be sized and designed to operate within temperature range of -10°C through +50°C and relative humidity of 95%.

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2. **Crane characteristics**

Crane on which the grab will be used is a multipurpose single Jib boom crane:

- 2.1 Crane lifting capacity for grab operations – 34 ton.
- 2.2 Opening and closing the grab shells is operated from the crane side by the current cable.
- 2.3 The electric connection to the grab is HARTING, the connector consists from 3 parts:
 - 2.3.1 Base HARTING PN 09370480301
 - 2.3.2 Male pins connection HARTING PN 09330242602
 - 2.3.3 Male pins connection HARTING PN 09330242612
 - 2.3.4 See the electrical drawings for the connection to the crane (Appendix I).

3. **Operation**

Scrap is delivered to the port by trucks and poured on the ground or into a big container located on the pier. Loading the vessel is done by a mobile harbor crane from the pier.

4. **Design criteria**

- 4.1 Grab and all its components will be of the **Heavy-Duty** design including any applicable strengthening and protection.
- 4.2 The grab will be designed and manufactured according to the latest available technology, regarding geometry and construction materials of the grab.
- 4.3 The manufacturer shall submit for review by the HPC copies of design drawings, calculations (structural, mechanical), catalogs information and detail drawings used to design and manufacture the grab.

The HPC review is to verify general conformity of the design with the specification and does not relieve the manufacturer from any responsibility. All information shall be submitted **early enough** to enable the HPC to submit rejections, comments and remarks to the design, before any purchase of material, components, manufacturing or another binding activity has been

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started. Thus, required modifications shall not affect the progress of the project.

The design shall be in metric form.

For each selected component, the manufacturer shall submit:

- Technical catalog and data sheet
- Marking of the selected component on the catalog.

4.4 **Classification**

The grab and its components shall be built from first class certified materials according to EN 10204 .All movable parts will be sealed, and designed for low maintenance intervals operation.

Max. life expectancy should be taken into consideration.

All components shall be designed so that they can be easily assembled / disassembled, adjusted, repaired and shall be easily accessible for inspection, cleaning and maintenance.

4.4.1 **Structure and arrangement**

The grab structure, and specially the corners shall be design to sustain the loads, stresses, impact, and vibrations generated during the operation. Special care is to be given for all hydraulic and electric components and connections protection.

4.4.2 **Regulations, Standards and Codes**

Unless otherwise mentioned the design, construction and equipment shall conform to the current requirements of the following group of applicable regulations, standards and/or codes:

4.4.2.1 AISC - American Institute of Steel Construction.

4.4.2.2 AWS- American Welding Society.

4.4.2.3 ASTM- American Society for Testing Materials.

4.4.2.4 DIN- Deutsche Industry Norm.

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- 4.4.2.5 Euronorm- European Norm.
- 4.4.2.6 FEM- Federation European de la Manutention.
- 4.4.2.7 ISO- International Standards Organization.
- 4.4.2.8 SSPC- Steel Structure Painting Council.
- 4.4.2.9 ILO- International Labor Organization.

In case of any difference between standard/code demands and this specification, the contents of the specification will prevail.
In case of contradiction between the codes, DIN/ISO standards shall govern.

4.5 **Main components**

4.5.1 **Grab scoops/claws**

Scoop/claw shall be designed using high grade steel so that the best durability is achieved.

4.5.2 **Scoop/claw tips**

Scoop/claw tips shall be of wear resistant special steel.

4.6 **Power unit**

The power unit motor shall be max 45 kw.
Motor protection class IP65.
Motor insulation class H.
Current circuit 380V , 50 Hz.

Time of grab closing shall be not more than 20 sec.
Time of grab opening shall be not more than 20 sec.

4.7 **Press rods**

The press rods (if any) shall be strengthened design, located at a concealed place in order to prevent damage from impact with the ship cells. Piston rods shall be chrome coated.

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4.8 Grab articulation points

The grab articulation points (bearings) shall be heavy-duty design, low maintenance bearings (close bearings are preferred).

Special care is to be given to maintenance, lubricating, greasing to assure no damage can occur to oiling/greasing points as to ease maintenance operations.

4.9 Technical remark

The shafts, pole pivot points and all other pivots will be fitted with detaching thread, in order to use pulling device for disassembling.

4.10 Inspection and follow up in the manufacturer's premises

Design review will be conducted in the HPC offices, unless decided otherwise by the HPC.

Inspection of parts - structural and mechanical, shall be performed, if so decided by the HPC, in the place of manufacturing / assembly / testing.

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4.11 Technical documentation

4.11.1 General

The following technical manuals, in English, shall be provided with the grab, three (3) hard copies. In addition, one copy on magnetic media (CD-ROM) shall be provided. The manuals shall be updated to the specific grab that were supplied to HPC. The manuals and information on the following list shall be provided sixty (60) days before delivery of the grab.

The mentioned documentation shall be comprehensive and include all the relevant information, that may be required in case of maintenance, break down or a failure in the structure / mechanical, to obtain data or any technical information required for the repair, maintenance or ordering parts without the need to dismantle the component.

The documents will be used for training of maintenance personnel and operators.

4.11.2 Parts lists/Components list

The manufacturer will submit to the HPC, within 30 days of the approval of the design, a complete and comprehensive list of components installed on the grab.

The list shall give detailed and complete information on technical data, type, make and ordering reference of the component. The list shall indicate the location and quantity installed per system/per grab as applicable. Reference to each component shall appear in the maintenance manual / parts catalogs.

Set of the complete technical catalogs, data sheets or brochures shall be prepared. The selected components shall be marked in the documents.

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4.11.3 All parts lists shall be in the following format

	system	part description	part cat. Number	Drawing (if exists)	OEM name	OEM part No.	Ordering unit	Repairable part (y/n)	Delivery time
1									
2									
3									
4									
...									

4.12 Spare parts lists

The manufacturer shall prepare his recommendation for spare parts to be kept in the ports stores. The list shall be prepared on the basis of the complete list of parts and on delivery time, quantity installed, etc. Prices and delivery time shall be noted in the list. The list shall include complete units as well as a breakdown to single components to the level of bearings, items etc.

Reference to each component and its parts breakdown as applicable shall appear in the maintenance manual.

The lists shall be handed with the proposal.

Spare prices shall be handled in the pricing envelope.

4.13 Maintenance manuals and parts catalogs

The maintenance manuals shall consist of the following chapters:

4.13.1 General description including drawings, data etc.

4.13.2 Operating instructions (such as pre-operation checkout, safety etc).

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4.13.3 Preventive maintenance program and procedures.

4.13.4 Maintenance instructions.

4.13.5 Parts catalog including parts breakdown and index of all parts number.

4.13.6 Standards.

4.14 **Lubrication**

4.14.1 **Lubrication Charts**

The manufacturer shall prepare a drawing showing all lubricated points, type of lubricant/oil to be used for each point and recommended frequency for re-lubrication / oiling.

4.14.2 **Lubricants**

In order to enable use of lubricants available in Israel, the manufacturer will provide a list of recommended lubricants for approval by the HPC. Only the approved lubricants will be used.

The equivalent Israeli materials will appear on the lubrication charts.

4.15 **Training of maintenance personnel**

4.15.1 Maintenance personnel instructions and training will be given to mechanics and electricians. Training will be based on three courses for each discipline one day each course.

All training aids will be left for HPC use after training completion.

4.15.2 **Classroom instruction shall include:**

- System theory
- Maintenance manual, operation manual, drawings familiarization and interpretation.

4.15.3 **On the job training shall include:**

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- Equipment familiarization.
- Maintenance tasks performance, which will include, monthly tri-monthly, semi-annually and annually inspection and maintenance.
- Systems adjustment.

5. **Shop work**

5.1 **General**

All structural and mechanical, work shall be performed by, or directly supervised, by qualified and skilled personnel.

5.2 **Structure**

Metal cutting, weld preparation, welders' certification, welding procedures and welding quality assurance shall meet the requirements of the relevant ISO standards, or the requirements of AWS D1.1 and AWS D14.4.

Intermitted welds and overhead welding shall not be used.

Structural parts shall be jig welded and jig drilled to assure accurate fit-up.

5.3 **Cleaning and painting.**

The paint system is a recoatable epoxy paint system based on Ameron B.V. paints. Alternative paints and / or paint system may be suggested by the supplier, subjects to HPC approval.

Paints manufacturer instructions should be strictly followed.

The cleaning and paintwork shall be executed in the shop, prior to the installation and assembling of the components on the grab.

5.3.1 **Surface preparation and cleaning**

All welds spatter, slags etc. shall be thoroughly removed and sharp edges rounded off. The spreader structure shall be dry-shot or grit blasted to cleanliness grade Sa 2½ according to ISO 8501 and roughness grade Medium S according to ISO 8503.

Dust, oil, grease and dirt shall be cleaned with viscous emulsion cleaner Ameron 57, washed with high-pressure tap water and dried completely prior to the application of the first coat.

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5.3.2 Painting system

Strip coat

Corners, plates' edges **and all welds**, shall receive one strip-coat of Zinc rich epoxy paint Amercoat 68, by brush (satin). DFT = 50μ.

Strip coat to cover 2-3 cm. on each side of the edge. Repair coat shall be applied to 5-6 cm. on all sides of the welded areas

<u>Layer</u>	<u>Paint</u>	<u>DFT(μ)</u>	<u>Shade</u>
Repair / Strip	Amercoat 68	50	
First coat	Amercoat 68	70-80	
Second coat	Amerlock 400C	70-80	
Top coat	Amercoat 450SG	70-80	RAL 1023 (traffic yellow)
Total (min).		230	

Each layer will have a different shade.

A period of minimum 72 hours is required prior to the shipment of the grab.

Note: The manufacturer may offer an alternative scheme for HPC consideration.

5.3.3 Grab scoops/claws

One coat of high built bitumen paint, 150 micron.

5.3.4 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. All bolts to be secured.

6. Final testing and acceptance

The following, are the major tasks and checkups to perform and approve prior the approval/acceptance of the ordered grab.

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- 6.1 The supplier shall submit to the HPC for approval the testing program. Final test shall be conducted at the supplier plant and test report shall be submitted to the HPC.
- 6.2 Static load test of 200% load performed by the supplier involving third party, well known inspection company. The supplier shall submit to HPC the test results and approval of the third party.
- 6.3 Checking together with HPC's representative the actual grab compliance with the technical specifications
- 6.4 Approving existence of all needed documents; e.g. spare part lists, maintenance procedures, etc.
- 6.5 Each grab will be supplied with all relevant maintenance spare parts for warranty period (two years). (According to manufacturer' maintenance instructions). Not including liquids
- 6.6 Performing an operational test; performing successful two working shifts.
- 6.7 An acceptance certificate (attachment FA of the agreement) will be issued only after approving of all a/m items and compliance with all the technical specifications.

7. **Warranty period**

The warranty period shall be two (2) years from the issuance date of the acceptance certificate of the grab.

The manufacturer undertakes to establish in Israel an appropriate Service Company to be active during the warranty period. The Service Company will repair the warranty defects, which are beyond the normal routine maintenance, including structure, electrical and hydraulic mechanical components.

Skilled, proficient and experienced personnel will be employed.

The response time shall not exceed 2 working days.

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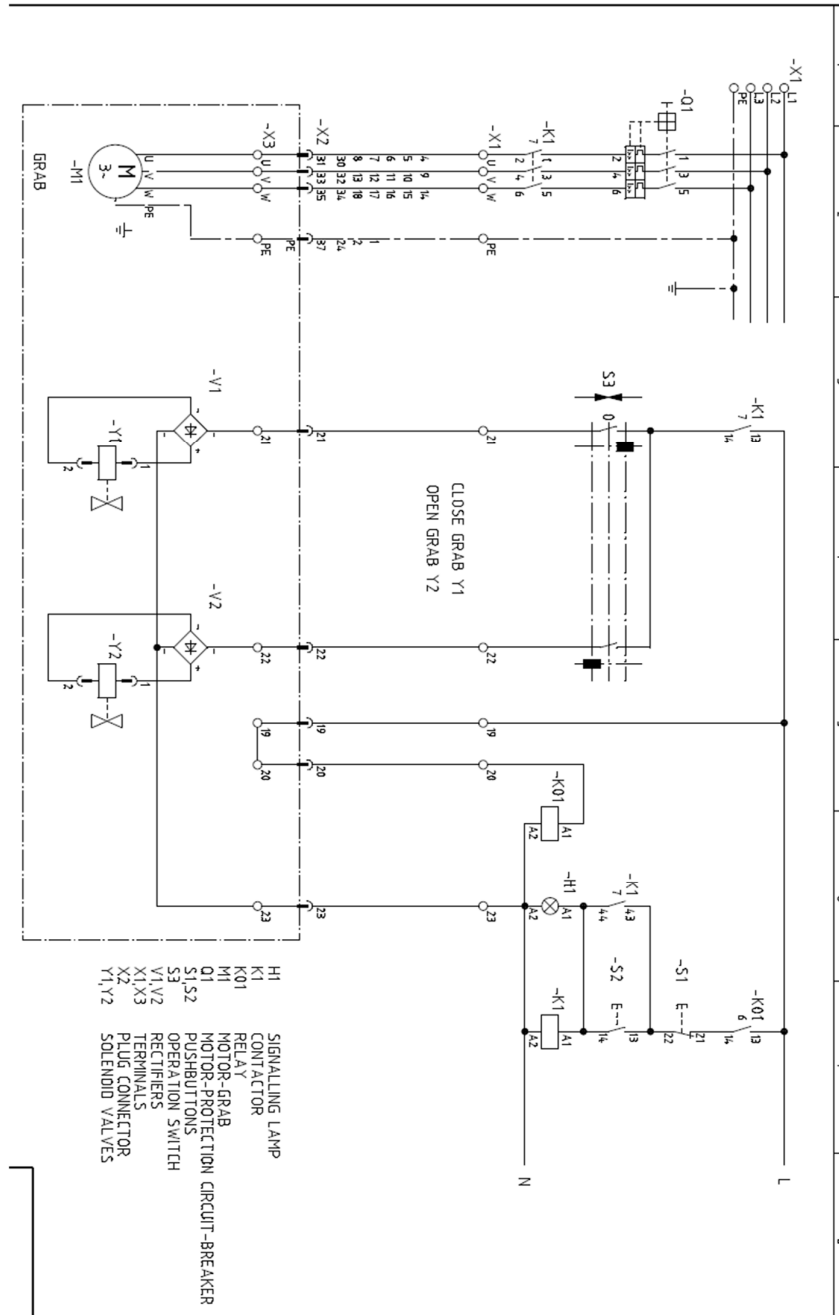
8. **Safety arrangements**
The design of the grabs shall conform to the safety **regulations and codes.**
9. **Quality Control**
 - 9.1 The manufacturer's Quality Control system should follow ISO 9001: 2015 guidelines.
 - 9.2 Manufacturer will submit to HPC, with his technical proposal, a QC/QA file for approval.
10. **Data to be submitted with the proposal (inter-alia)**
 - 10.1 Grab technical specification
 - 10.2 Grab drawings
 - 10.3 Completely filled out data sheet. (Section II)
 - 10.4 Completely filled out summarized mandatory list. (Section III)
 - 10.5 Recommended spare parts to keep in stock list according manufacturer experience and recommendation to cover all "foreseen" spare parts consumption for 3 years operation (not routine maintenance). The list shall include at least the following Information: manufacturer P/N, OEM P/N, part description. (excel file, see table format at appendix II)
 - 10.6 Recommended spare parts list to cover spare parts requirements for 2 years of operation based on manufacturer's maintenance instructions. (excel file, see table format at appendix II)
 - 10.7 The supplier shall return a signed and filled copy of this specification
 - 10.8 Final test report and quality check list sample
 - 10.9 Greasing points list with drawings
 - 10.10 Liquids and consumables list including quantities and replacement intervals, OEM, description, standard (for liquids).
 - 10.11 Maintenance Periodic Intervals check list

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- 10.12 The manufacturer shall return a copy the technical specification and note at the end of each paragraph if the offered equipment complies or not with this specification

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Appendix II -Spare parts format

	system	part description	part cat. Number	Drawing (if exists)	OEM name	OEM part No.	Ordering unit	Repairable part (y/n)	Delivery time
1									
2									
3									
4									
...									


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