

אפי קגנובסקי הנדסה (א.ק.ה) בע"מ.

EFI KAGANOWSKI ENGINEERING (E.K.E) Ltd.

#236472

PETROLEUM & ENERGY INFRASTRUCTURE

ASHKELON Terminal.

FULL CONTACT INTERNAL FLOATING ROOF & FLOATING SUCTION ARM

(Version 007)

הערה	אישור	סטאטוס	תאריך
F.C.I.F.R	א.ק	Review	18.2.20
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SCOPE:

This document covers the technical requirements for the design, fabrication, supply, delivery, installation, manufacturer supervision oversee and assist with the installation of full contact internal floating roof as well as primary and secondary seals systems and 8" floating suction arm to be install at tank N° T-31at Ashkelon Terminal
The manufacturer shall submit complete design and material specifications and emissions estimate with his proposal for purchaser approval of the internal floating roof.

SITE CONDITIONS:

1. Ashkelon South Terminal.
2. Site altitude is about 10 m above sea level.
3. Ambient temperature varies between 5⁰C and 48⁰C.
4. Relative humidity varies between 35% and 90%.
5. The tank is very close to sea shore.

TANK AND FLOATING ROOF DATA & ACCESSORIE:

1. Tank diameter / high	10.7 m/ 8.0 m
2. Tank shell manhole diameter:	2x30" @ shell and 1*24" @ roof
3. Tank fix roof:	steel dome roof.
4. Tank bottom:	1.5% slope to central.
5. Corrosion allowance:	1 mm.
6. Low leg level:	1300 mm.
7. High leg level:	2100 mm.
8. Filling / Empty flow rate:	200/120 m ³ /hr.

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LIQUID PROPERTIES:

The tanks will handle distillate and tank bottom as water drainage as describe hereafter.

GAS OIL:

Density 15 ⁰ C (gr/ml)	0.870
Kinematics viscosity @ 15 ⁰ C (CST)	6-7.5
Sulphur content (wt %)	0.25% max
Acidity (mg koh/gr)	0.25
Cold filter plugging point (C)	9 (max summer) -2 (max winter)
Flash point:	55 C
Copper corrosion (2 HRS/100 c)	1 max

GASOLINES:

Density 15 ⁰ C (gr/ml)	0.73 –0.765
Copper corrosion (2 hr. /100 C)	1 max
Aromatics (vol %)	60
MTBE (%)	15
Sulphur content (wt %)	0.15
Vapor pressure 37.8 ⁰ C (PSI)	9 max

DRAINAGE WATER:

Tanks water drainage.

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Part #001: Internal Floating Roof

ROOF BASIC STANDARDS & REGULATIONS:

The floating roof shall be designed, fabricated and installed according to the requirements of the following codes and standards:

1. API 650 Appendix H: Welded Tanks for Oil Storage, Twelfth Edition, including addendum 2 and errata 2.
2. Aluminum Design Manual as published by The Aluminum Association Inc.
3. ASTM B96.1 Section 2: Aluminum Components.
4. ASTM A240: Stainless Steel Components.
5. ASTM A193 and A194: Stainless steel fasteners

FLOATING ROOF DESCRIPTION & SPECIFICATION:

General:

The IFR shall be one of the following options:

- Honey-comb aluminum panel's manufacturer without any welding along the bottom edges.
Each panel shall be tested and certificated before it will be supply.
- Pan type made of aluminum sheets and extruded profiles
The deck surface shall be made of subdivided component panels.
The floating roof shall not contain any enclosed or hollow compartments, so a floating roof inspection for safe operations and entry can be made from the tank fixed roof.

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Both option providing full contact with the storage liquid .

The roof design will allowed field repairs of any component of the roof without the need to take the component out of the tank.

Panels shall be joined together by means of bolted and gasket clamp and channel members bonded to the panel. The joint shall be transmit the design loads without failure or leakage

The outer edge of the floating roof shall be circular, designed and fabricated to be concentric with the tank shell.

The nominal space between the deck and the tank shell will be nom. 8" (200mm), and shall be sealed with both primary and secondary seal systems, design to accommodate the gap between those elements and a +/- 4 inch variance of the gap.

The design and the construction of the floating roof shall be to minimize emissions from the tank. The floating roof vendor shall include with their proposal estimated emissions based on Tanks4.09d software and the following parameters: (24) turnovers of gasoline location Houston TX, and white tank in good condition.

The floating roof shall be designed to operate throughout its normal travel without manual attention and without damage to any part of the floating roof, or floating suction arm or the fixed roof.

The floating roof shall be naturally buoyant and provide buoyancy to support at least twice its dead weight, plus additional buoyancy to offset from friction exerted by peripheral and penetration seals.

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The floating roof shall be designed to support at least two men walking anywhere on the roof while the roof is floating or resting on its supporting legs without damaging the floating roof and without allowing product on the roof.

The floating roof shall be fitted with the following accessories:

- 8" Guide and pole element.
- 8" Guide pole penetration floating cover double seal element
- Floating cover gauge funnel with funnel plug located under the 10" fix roof nozzle.
- 2 Man ways bolted and gasket, which can be opened from above or below and incorporate access ladders (2 man ways).
- 2 Leg type Pressure / vacuum relief units.
- Two position stainless steel legs.
Changing leg position shall be accomplished from the top side of the floating roof and while the tank is in service.
Each leg shall be capable of vertical adjustment of at least 3" in each direction for adjust tank bottom plate settles.
The legs shall be self-drainage.
- 2 off Anti-rotation nozzles & elements including upper fix roof anchors, IFR cable guide blocks and tank bottom plate anchors units.
The cables shall be made from min 1/4" stainless steel stranded cable. The floating roof penetrations for each cable shall extend at least 6" above the liquid level.
- 2 off Grounding cables including cable clips to the IFR beams and traps cable clips upon the tank fix roof.
- One (1) 8" center vent.
- Four fixed roof circulation vents

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- One (1) shell vents installation with hood & screen.
- Ladder and ladder pad.

Materials of construction

- All metallic parts of the floating roof shall be aluminum or austenitic stainless steel. Carbon steel components and plated fasteners are not allowed.
- Pop-rivets, self-drilling and self-tapping fasteners are not allowed.
- All bolts must be secured with nuts. All bolting except for rim and column seal components shall be 3/8" minimum. Rim seal bolts shall be 5/16" minimum, all other bolts shall be 1/4" minimum.
- Aluminum shall conform to the requirements of section 2 of ASME B96.1.
- Stainless steel shall conform to the requirements of ASTM A240M/A240.
- Seal materials shall be selected after consideration of the ambient temperature, design temperature and the liquid that will be stored in the tanks. Shoe plates shall be stainless steel.

Roof penetrations:

All appurtenances for the devices penetrating the deck shall be provided with a double seal system which will permit a local deviation. The sealing elements shall be designed to allow movements of the vertical devices without any liquid or vapor leaks.

Rim seals:

The floating roof shall be supplied with both primary and secondary sealing systems. The primary seal shall be scissor type mechanical shoe seal type and the secondary seal shall be a flat wiper compression plate. Emissions estimates shall include values for the seal system(s) proposed.

Dissimilar materials:

Dissimilar materials which are not compatible shall be physically separated or insulated from each other by means of gaskets or

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insulating compounds. Spacers for stainless steel legs shall be provided.

Static bonding:

All floating roof metal elements shall be electrically interconnected and bonded to the tank fixed roof by means of at least two 1/8" minimum stranded stainless steel cables.

Part #002: 8" Floating Suction Arm

SCOPE:

The tank fitted with 8" floating suction arm. The arm is a scissors type unit as shown at the attached pictures. The contractor will dismantle the existing arm, supply and install a new 8" floating suction arm.

TECHNICAL REQUIRMENT:

The floating suction arms shall be 8" diameter size ~ 8 m long installed inside the cylindrical vertical storage tank. The arm shall be fitted with a stainless steel restraining chain attached to upper end of the pipe and the tank bottom.

The floating arm as well as the roller must be placed as to miss the floating roof legs or the guide & pole device or the IFR nozzles.

The contractor shall supply and install floating arm base support up on the tank bottom plate.

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The floating suction shall consist of the following components:

180 degrees style submerged, aluminum swing joint, ANSI Class 125 FF flanged with double row stainless steel ball bearings and Viton seals

The swivel shall be lubricated and sealed for submerged service for life time.

Swivel joint shall be internally hydro-tested to 50 psi prior to shipment.

- A 1/4" size vent hole shall be drilled in the suction tube elbow to allow the release of entrained air from the elbow.
- One pair of flooding ports 1/4 size shall be drilled near the swivel (one port on each side).
- Pivoted stainless steel floats, air tested with rated buoyancy at twice theoretically required floatation so that float is half submerged normally.
- The arm shall be fitted with roller to provide a smooth roiling of the arm under the IFR

PACKING:

- All rotation elements shall be factory lubricated and tied up.
- All ports and opening shall be blanked off.
- The goods shall be packed of in containers or wooden boxes with water repellent materials.
- Each box shall include itemized part list.
- The package shall be suitable for export and capable of withstanding rough handing.

MARKING:

- All floating roof materials, items and accessories shall be suitably marked for identification on site.
- Loos parts shall be suitable tagged.

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- All crates shall be marked.

SUPERVISION & EXPERIENCE:

The manufacturer shall provide a supervision person for oversee and assist with the installation of the internal floating roof system.

WARRANTY:

The contractor shall guarantee the design, materials, equipment's, and workmanship for a period of 24 months from operation but not later than 30 months after shipment.

Should any defect due to faulty design, materials or bad workmanship become apparent during the guarantee period, the vendor shall agree to make all necessary to repairs or replacements the defect parts, free of charge, and shall pay transportation costs involved.

SHOP DRAWING AND DESIGN:

The contractor shall provide within 2 weeks from order all drawings, dimensions & sizes list, thickness, gauges, materials, finishes, joints attachments and erection procedure, and a complete set of design calculation for the purchaser's approval.

Units: All drawings and dimension prints shall be in accordance with the SI System.

Language: All proposals, drawings, specifications, material/quality Control sheet, reports, test certificates and other documents shall be in English or Hebrew.

PRICE:

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N°	Description	Unit	Price (\$)
1	IFR included primary and secondary seal, dome roof vents The offer includes the design, supply delivery, <u>installation</u> and manufacturer <u>supervision</u>	Complete	
2	8" Floating suction arm fitted with all accesses. The offer includes dismantling of the existing arm the design, supply delivery, and <u>installation</u> of a new one.	Complete	

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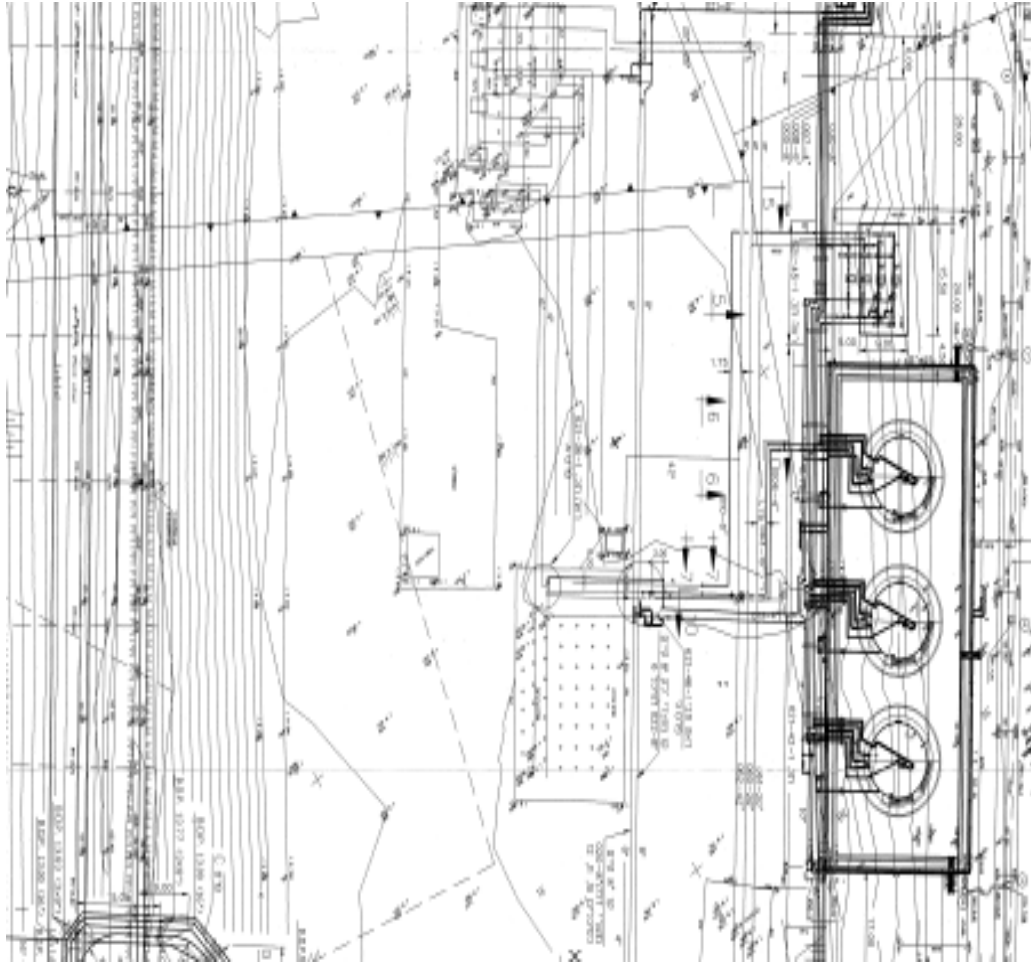
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