
	Project	UPGRADING OF THE FIRE FIREFIGHTING SYSTEM IN KIRYAT HAIM TERMINAL	
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DOCUMENT TITLE: Specification for Canned Vertical Turbine Fire Water Pumps			

ENERGY INFRASTRUCTURE LTD

KIRYAT HAIM TERMINAL

UPGRADING OF THE FIRE FIREFIGHTING SYSTEM IN

PUMP HOUSES J-4, J-5

SPECIFICATION FOR CANNED VERTICAL TURBINE FIRE WATER PUMPS

P1	02.06.22	For Tender	U.W	Z.S.	Z.S.
P0	26.09.21	For Comments	H.S	Z.S.	Z.S.
Rev	Date	Description	Prepared by	Checked by	Approved by

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1. SCOPE

1.1. General

This specification covers the requirements for the design and supply of two (2) canned vertical turbine fire-water pumps complete with drive and controls, to be installed in the at Kiryat Haim Terminal in Pump Houses J-4 and J-5.

1.2. Scope of Supply

- 1.2.1 Two (2) complete diesel engine driven pumps, according to data sheet in Attachment "B".
- 1.2.2 The pump units including pump controller shall meet the requirements of NFPA 20 and shall be UL-FM approved.
- 1.2.3 Spare parts as specified by purchaser.
- 1.2.4 Documentation as specified in Attachment A..

2. PUMP INSTALLATION

2.1 Location

The pumps shall be installed indoors pump house J-5 at distance of 350 m from the water tank T-59, in Pump House and pump house J-4 at a distance of 700 m from the water tank T-59.

2.2 Site conditions

Prevailing weather conditions are as follows:

Temperature: - min winter 4 °C
max summer 45 °C

Altitude: +20 m

Maximum relative humidity: 85%

3. PUMPS REQUIREMENTS

3.1 Performance

Pumps shall be rated at 5000 GPM (1135 m³/h) at a net pressure of 160 PSI (11.03 bar gauge).

The shut-off pressure shall not exceed 195 PSI (13.4 bar gauge).

3.2 Rating

Pumps' duty point - see attachment B.

Note that the pumps' differential head as noted in pump data sheet is defined as the head difference between pump inlet and the center of the discharge.



Pumps must be capable of continuous operation at any point along the pump curve with characteristic curve falling continuously from no flow to maximum flow.

3.3 Pump Materials

Pump materials shall be as follows:

- Shaft and detachable suction strainer type 316 - stainless steel
- Impellers - bronze
- Pump bowls – cast iron
- Columns – carbon steel, flange jointed and externally and internally coated with oven baked epoxy
- Discharge head – fabricated carbon steel externally and internally coated with oven baked epoxy with flanged horizontal discharge located above mounting flange
Discharge flanges to be according to ANSI B 16.5 (see attachment "B")
- Top Shaft & Hardware - stainless steel 316

4. DIESEL ENGINE

4.1 Aspiration

Diesel engine shall be normally aspirated and shall preferably be manufactured by Cummins, Caterpillar or other well-established company which maintains maintenance and spares establishment in Israel.

4.2 Arrangement

The engine shall be mounted on a fabricated steel base-plate and connected to a right angle drive gearbox mounted on the pumps' head.

Any couplings shall be protected by an OSHA approved guard.

4.3 Engine Rating

The engine shall be rated for a horse power at least 10% greater than the maximum BHP required by the pumps at any point on the pumps' curve, when operating at design speed (rated RPM).

4.4 Engine Accessories

Engine and accessories shall conform to NFPA 20, and include, but not be limited to the following:

- Governor adjustable to regulate speed within a range of 10% between shut-off and maximum load conditions
- Over-speed trip to shut engine down at 20% above the rated speed, with manual reset and alarm signal
- Tachometer – with an hour meter.



- Oil pressure gauge
- Temperature gauge
- Instrument panel
- Storage batteries:
Starting shall be by electric starting device, taking current from two (2) sets of storage batteries. The batteries shall have sufficient capacity at 40°F to maintain the cranking speed for 12 consecutive starting cycles during 6 minutes.
Starting solenoids to be fitted for possible emergency manual operation. Batteries shall be mounted in racks and connected by suitable cables.
- Battery chargers:
Battery chargers shall have an external power source. Dual battery chargers shall be supplied and shall be specifically approved for fire pump service and conform to NFPA 20.

4.5 Cooling System

Closed circuit type including an water cooled radiator with cooling water circulation controlled by thermostat.

Heating to be provided to maintain the engine at a temperature for an immediate full load start.

4.6 Fuel Supply

A tank to be supplied for engine having not less than one US gallon capacity per rated engine horse power capacity, plus 5% volume for expansion and 5% volume for sump.

Tank shall include:

- Level gauge
- Drain
- Fuel take-off shall be not less than 2" above drain point
- Tank shall be mounted separately from engine and elevated to provide gravity feed of fuel

The proposal for the fuel tank shall be optional.

4.7 Exhaust System

Engine shall be supplied with unfitted silencer and flexible pipe.

5. GEARBOXES

- 5.1 Right angle gear device shall meet the relevant AGMA specifications; including 923-B05 metallurgical specifications for steel gearing.
- 5.2 Gear device shall preferably not require water cooling. If water cooling is required, a visual means to determine water circulation shall be provided.



- 5.3 The diesel engine shall be connected to the right angle gear device by means of a flexible shaft.

6. CONTROLS

6.1 General

Vendor to supply an automatic controller for each pump, pre-piped and pre-wired to include all control functions required, as detailed below, and according to the minimum requirements of NFPA 20.

Controller to be mounted integrally with engine base-plate.

Enclosure and all electric wiring and equipment shall meet the requirements of NEMA 4.

6.2 Control Functions

The following control operations and indication functions are required for the diesel engine:

- Start-stop push-button
- A common alarm bell and individual alarm lamps to indicate:
 - low engine oil pressure
 - engine coolant temperature high
 - engine has failed to start when called upon
- Automatic provisions for alternate use of two separate storage batteries
- Intermittent cranking of engine with lock-out if engine fails to start after specified number of attempts
- Provision for lock-out alarm if a battery is disconnected or becomes inoperative
- Provision for 10 seconds delayed start
- Provision for remote starting

6.3 Sequential Timing

The controllers shall incorporate a sequential timing device.



7. TEST

- 7.1 The pumps shall be performance tested at the vendors works to provide detailed performance data, and the pumps characteristic curve drawn based on not less than 5 points (inc. NPSHr), including shut-off and 150% of rated flow.
- 7.2 The diesel engine shall be factory tested in accordance with manufacturers standard tests which shall include over speed trip.
- 7.3 The complete diesel driven pump package is to be assembled in the Vendor's workshop, including control panel and battery charging device.
- 7.4 The complete package is to be tested for all controller functions. This test may be carried out "dry".
- 7.5 Full acceptance test will be made on the installation site according to the manufacturer manual with not less than 10 points including Churning, 100% and 150% of nominal flow and pressures. The net pressure will be determined in each point using a suction pressure gage with 1 bar or 10 m head full scale. The tests will be made with calibrated vibration dampened gauges.

Each point will include reading of pressures at the controller, discharge gauge, controllers' gauges, suction gauge, flow-meter, RPM, engine Temp. RPM reading will be ascertained by an external RPM meter.

The pumps' characteristic will be adjusted for RPM deviation from nominal RPM.

Maximum total pressure will not exceed 195 PSI

The acceptance test will be attended by the Purchaser.

A complete test report will be provided by the supplier signed by the Purchaser's representative.

8. PACKING

The assembled pump-drive units are to be suitably packed for international transport.

Any unfitted components shall be clearly labeled and packed with the main equipment to which the components are to be fitted.

All machined surfaces are to be protected against corrosion by coating with a suitable anti-corrosion compound, while threads are to be protected by either a threaded plug or threaded plastic cap. Openings are to be protected by plywood or similar covers securely fastened to the opening.



9. GUARANTEE

The equipment furnished shall be guaranteed free from faults in design, workmanship and materials and that the equipment shall be of sufficient size and capacity to meet the operating requirements specified and all requirements of NFPA 20.

Should any defect in design, material, workmanship, or operating performance develop during the first year of operation the supplier shall make all necessary modifications, repairs or replacement at no charge to the Purchaser.



ATTACHMENT "A"

DOCUMENTATION REQUIREMENTS

The following table specifies the documents required at the various stages of supply:

Column A: Shows documents to be submitted with bid.

Column B: Show final and certified documents to be submitted on delivery of the pumps.

Item	Document	A	B
1	General outline dimensions of complete pump unit including tank and unit weight	3	
2	Recommended installation dimensions	3	
3	Technical details and performance of driving unit and pump	3	4
4	Characteristic curve for engine including power and torque against RPM and fuel consumption	3	
5	Pump characteristic curves, power and head vs flow at rated RPM	3	
6	Installation, operating and maintenance instructions		4
7	List of spare parts recommended for two (2) years operation with itemized prices	2	
8	Certified test results for pump and engine		4

Note: number in table refers to number of copies to be transmitted.

ALL DOCUMENTS SHOULD BE IN PDF (SCANNED FILES WILL NOT BE ACCEPTED).

ALL DRAWINGS SHOULD BE IN DWG FORMAT UNLESS OTHERWISE SPECIFIED.



ATTACHMENT "C"

Quotation Summary

Item	Description	Qt.	Unit Price	Total
1	Complete units including Pump and Motor	2		
2	Fuel Tank (option)	2		
3	Fuel Tank Accessories (option)	2		
4	Variable Speed Pressure Limiting Control	2		
5	Approved anti water hammer check valve	2		
6	Water Flow test meter	2		
7	Pressure relief valve	2		

