

ENERGY INFRASTRUCTURE LTD.

SPECIFICATION FOR VERTICAL TURBINE PUMPS

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Rev	Date	Description	Prepared by	Checked by	Approved by

1. GENERAL

- 1.1 This specification covers the requirements for design and supply of two (2) vertical turbine pumps complete with electric motors required for transferring diesel fuel.
- 1.2 The Pumps to be installed at the Kamad Ashdod facility operated by Energy Infrastructure Ltd outdoor in ambient conditions of 5°C to 45°C and relative humidity of 30% to 95%.
- 1.3 The pump and pump auxiliaries shall meet all requirements of this specification, the attached data sheets and the API 610 standard latest edition.
- 1.4 In the event of conflict between this specification and the attached data sheets the data sheets shall govern.
- 1.5 When transferring diesel, the pumps shall deliver up to 450 m³/hr at a differential head of 450 m.

For further details refer to Appendix "A".

- 1.6 The pump covered by this specification are listed below:

Quantity	Description	Data Sheet No.
2	Diesel fuel transfer pumps	1

2. SCOPE OF SUPPLY

- 2.1 Two (2) Vertical Turbine Can type pump according to data sheet in Appendix "A", and this specification, complete with suitable vertical electrical motor in accordance with paragraph 4.
- 2.2 The pump and driver shall be supplied as a factory-assembled and matched unit to ensure proper factory alignment and minimize field assembly.
- 2.3 All items and accessories as specified in paragraph 3.9.
- 2.4 Certified drawings and documents, including assembly, dimensional and sectional drawings, as specified in Appendix "B".
- 2.5 Packing & delivery.
 - 2.5.1 All equipment shall be shipped in the maximum possible sub-assemblies to minimize field assembly the pump bowl assembly, discharge head, and motor shall be shipped as integral units.

3. GENERAL REQUIREMENTS

- 3.1 The pumps supplied according to this specification shall be designed, constructed and tested according to API 610 (latest edition).

The intent of this specification is not to supersede the above mentioned standard but to supplement, amend or limit it as required.
- 3.2 Pumps shall not be prototype. Supplier shall provide, reference list of pumps operating on similar duties.
- 3.3 Duty
 - 3.3.1 Pump duty points shall be according to data sheet in Appendix "A".
 - 3.3.2 Differential head as noted on pump data sheet is defined as the head difference between pump inlet and the outlet of the last stage.
- 3.4 The impeller diameter shall not exceed 95% of the maximum impeller diameter allowable for pump casing.

- 3.5 Pumps H-Q curves shall be gradually sloping in one direction with maximum head at "NO FLOW" condition.

Pumps to be suitable for operating at shut-off condition for at least 2 minutes.

Vendor to specify the minimum flow requirements, which should not exceed 30% of design flow.

The characteristic curves to include curves for head (m), NPSH (m) required, efficiency (%) and horsepower (BHP) against flow (m³/hr).

Curves to be corrected for specific gravity and viscosity specified in data sheet (appendix "A").

- 3.6 Pump and driver shall be directly coupled.

3.7 Connections

Pumps discharge nozzle shall be flanged to ANSI B-16.5, 600#, R.F. Any screwed pipe connections shall be to ASME B-1.20.1

3.8 Painting

To manufacturer's standard, all carbon steel surfaces shall be preferably epoxy painted or powder coated. Painting specification shall be submitted by vendor and be suitable for the ambient conditions specified in Section 1.2.

3.9 Accessories

Pumps shall be supplied complete with all items and accessories necessary for its satisfactory operation, including the following:

3.9.1 Lubrication system and fittings, including any piping which may be necessary.

3.9.2 Any special tools required for maintenance and servicing.

3.9.3 Coupling between pump and motor including guard.

3.9.4 Mechanical seal (see data sheet). API plan 11 is preferred, but the vendor may propose an alternative if there is any issue with this option.

3.9.5 Thermal protection device (PT-100) for bearings and pump case

3.9.6 Vertical can

3.10 Nameplate

The pumps and motors shall bear an individual nameplate of at least 16 gauges stainless steel. Nameplate shall follow manufacturer's standard and contain the following data:

3.10.1 Pump

- Name of manufacturer
- Year of manufacture
- PEI item number
- Model number
- Important equipment data (working point, shut-off pressure, RPM, bearing type, rotation direction)

3.10.2 Motor

- Name of manufacturer
- Year of manufacture
- PEI item number
- Model number
- Rated power (kW)
- Insulating class
- RPM
- Enclosure (Ex. Protection).

3.11 Packing

Prior to packing, the pump shall be cleaned both internally and externally, and the interior protected by a suitable rust preventative,

and all openings sealed with either plastic plugs or plywood covers securely bolted to flanges.

A Joint Visual Inspection (Vendor and Purchaser) shall be conducted upon delivery to the Ashkelon warehouse to verify the packing list and condition of equipment. Following this inspection, the Purchaser assumes responsibility for the equipment.

Any claims regarding the delivery or missing components must be submitted within 12 months of the delivery date to Ashkelon.

3.12 Tests

Tests to be performed as specified on the attached data sheet.

Test procedures shall be in accordance with API 610.

The Vendor shall provide sufficient advance notice to the purchaser before conducting any inspection or test.

The purchaser representative shall have entry to all vendor and vendor sub-contractors plants where manufacturing, testing or inspection of the equipment takes place.

4. **ELECTRICAL REQUIREMENTS (DRIVER)**

Refer to Specification for 3.3kv Squirrel Cage Induction Motors (Document No. 4575.23-080).

5. **DOCUMENTATION**

The vendor's proposal shall be written in English and shall include documentation as specified in "Documentation Requirements", Appendix "B".

Manufacturer's certificates to be submitted giving details of all tests undertaken.

6. **GUARANTEE**

6.1 Mechanical

Unless the vendor in his proposal records exception, it shall be understood that the vendor agrees to the guarantees specified in items 6.1.1 and 6.1.2 below.

6.1.1 All equipment and component parts shall be guaranteed by the vendor against defective materials, design, and workmanship for 12 months after being placed in service.

6.1.2 If any malperformance or defect occur during the guarantee period, the vendor shall make all necessary alterations, repairs, and replacements free of charge, free on board factory. Field labor charges, if any, shall be subject to negotiation between the vendor and the purchaser.

6.2 Performance

The equipment shall be guaranteed for satisfactory performance at all operating conditions specified on the data sheet. Field checks on performance, when made by the Purchaser, shall be made within 60 days of initial operation.

Manufacturer's certificates to be submitted giving details of all tests undertaken.

7. COMMISSIONING AND TRAINING

The vendor's proposal shall provide the services of qualified field engineer to supervise the pumps assembly & initial start-up (first operation) and commissioning of the pumps at the Ashdod site (conducted by PEI contractor).

The vendor shall provide a comprehensive Operation & Maintenance (O&M) manual in English.

Following installation, the Vendor shall conduct a local training session for the Purchaser's operation and maintenance personnel, covering routine checks, troubleshooting, and safety procedures.

Appendix "A"

Data Sheet

מ"הנדסה וניהול (1980) בע"מ "PAZ" Engineering & Management (1980) Ltd.				DATA SHEET FOR VERTICAL TURBINE PUMP			
CLIENT: Energy Infrastructure Ltd.				PROJECT: 4575.23			
UNIT: Kamad Ashdod				SERVICE: Diesel			
EQUIPMENT NO.:				NO. REQ'D: 2		DRIVER: Vertical Electrical Motor	
MFR.:				SIZE & TYPE:			
1. OPERATING CONDITIONS EACH PUMP				2. PERFORMANCE			
Liquid: Diesel		m ³ /hr at PT Min.:		Nor.: 450		Rated: 450	
		Disch. Press. Barg Min		Nor.: 37.1		Rated: 37.1	
PT °C Nor.: 20 Max: 30		Suct. Press. Barg Max.		Nor.: 0.1		Rated: 0.1	
Liq. SP. Gr. At PT: 0.83		Diff. Press. Bar 37		NPSHa: 3.6m		Max. BHP Rated Imp.	
Slurry . Sp. Gr. @ PT:		Diff. Head. 455 m				Shut-off Head: 550 m	
Vis. At PT: 4.5 cSt		pH:		Vap. Press @ PT Bar: 0.05		Min. Continuous m ³ /hr:	
Operation: ☐ Sgl ☐ Paralel:						Torque m- Kg @ Rpm	
Liquid Composition % :		Solids S.G.		% by ☐ WT ☐ Vol.		WR ² Kg- m ²	
Hydrocarbons		Description:		Max Particle Size		4. Tests	
						Non- Witn	
						Performance Yes	
						Hydrostatic Yes	
						NPSHr Yes	
3. CONSTRUCTION							
Nozzles	Location	Size	Rating	Facing	Misc. Conn.	Inspection By	
Suction	Side	By Vendor	600#	RF		5. MATERIALS	
Discharge	Side Above mounting plate	By Vendor	600#	RF		Impeller: Cast Iron	
Case - Mount. ☐ Centerline ☐ Foot ☐ Bracket ☐ Vert (Type) TURBINE ☐ In Line				Casing: Carbon Steel			
Rotation (Viewed From Cplg. End)				No. Stages As required			
Suction: ☐ Sgl. ☐ Dbl.				Case Split: ☐ Radial ☐ Axial			
Volute Type:				Impeller: ☐ Closed ☐ Opened ☐			
Impeller Dia: Rated -				Max. for Casing: min. :			
Case Press: Max. Allow				Barg @ °C Test: Barg			
Bearings: Type: Radial Anti Friction				Thrust: Anti Friction			
Life Rating 25000 L10				Materials acc. to API 610 VS requirements			
Coupling:				Mfr & Model:			
Packing: Mfr., Type, Size: No				Base Plate:			
Mech. Seal: Mfr & Model:				7. VERTICAL PUMPS			
Mfr Code:				Pit Or' Sump Depth MAX 6 m			
Axial Thrust Balancing				Min. Water Level			
First Crit. Speed:				RPM. Lining:			
6. SEAL AND COOLING WATER							
Cooling Water m ³ /hr/Barg: Not Required				Suction: ☐ Bell ☐ Flg. ☐ Wet Pit			
Bearings /				Disch: ☐ Below ☐ Above Mtg. Plate			
Stuff. Box /				Min. Submergence Req'd. m			
Pedestal /				Column Pipe: ☐ Flanged ☐ Threaded			
Total /				Line Shaft: ☐ Open ☐ Enclosed			
Seals Flush: ☐ Internal				Brgs: ☐ Bowl ☐ Line Shaft			
☐ External:				Brg. Lube ☐ Water ☐ Oil ☐ Grease			
m ³ /hr/Barg : /				Float & Rod ☐ C.S. ☐ S.S.			
				☐ Bronze ☐ None			
8. MOTOR DRIVER BY /MOUNTED BY:				Float Switch			
HP	RPM	Frame	V/ph/Cycl.	Pump Thrust, Kg ☐ Up ☐ Down			
Mfr	Bearings: Antifriction	Lube:		at Min/ Rated Flow /			
Type: Induction	Insul:	Full Load Amps		Approx. Wt. Pump & Base:			
Enc.:	Temp Rise. °C	Locked Rotor Amps		Weight of Motor:			
☐ VHS ☐ VSS	Vert. Thrust Cap., Kg						
NOTES:							
2. Δ - To Be Completed By MFR							
P4	Update For Bid	05/10/2026	T.T				
P3	Up Date For Bid	16/08/2026	A.C.	Z.S.			
P2	For Bid	16/08/2026	T.T				
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P0	For Comments	22/10/2025	N.S.	Z.S.			
REV	DESCRIPTION	DATE	BY	APPR'D	ORDER NO. SHEET 1 OFF 1		

Appendix "B"

Documentation Requirements

The following schedule of documents constitutes a part of the technical specification. The order will be regarded as complete only after these requirements are fully met.

ITEM	DESCRIPTION	DOCUMENTS TO BE TRANSMITTED	
		WITH BID	AFTER RECEIPT OF ORDER
1	Outline dimensions & support requirements (if any) and installation	3 prints	Digital media (DWG) + 3 prints within 30 days of order
2	Cross section & assembly dwg with parts description	3 prints	Digital media (DWG) + 3 prints within 30 days of order
3	Complete parts list	-	3 prints within 45 days of order
4	Vendors data sheet	3 prints	-
5	Certified performance test certificates	-	3 prints with delivery
6	Motor details acc. To spec.# 4575.23-080	3 prints	-
7	Instructions for installation, operation and maintenance	-	4 prints with delivery
8	Priced list of recommended spares for 2 years operation	3 prints	