Please issue GAD with nozzle size and dimensions
It is needed for the purpose of our initial decision

Technical offer

Attn.
HSE Group

Quotation

Subject: ABT 360 KT/Y PP PLANT Project
Gas Booster compressor
Job no.: SE-01-00573
Airpack reference: 23249-COM

Zierikzee
Date: January 31st, 2024

Dear Sir / Madam,

With reference to your above mentioned inquiry, we have the pleasure to send you our quotation for the following:

Item	Scope of supply	Price Unit	EURO Total
A.	Equipment no.: PK-6801		
	One (1) complete packaged skid with: One (1) non lubricated, water cooled, double acting, balanced opposed, horizontal piston gas compressor, Temporary inlet strainer, Pulsation dampers, Intercooler, V-belt drive by E-motor, Instrumentation, PLC based control panel (installed remote), Local instrument junction boxes, Interconnecting piping within skid, SS316L instrument tubing, Instrument cabling according IEC 60332, Galvanized cable trays, Heavy duty base frame, Removable four point lifting frame with lifting lugs 100% MPI, First fill of lubricants and consumables.		
	Technical specifications as per item 1 and 2.		

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Item **Scope of supply**

B. Technical features included in base offer

Mechanical design:

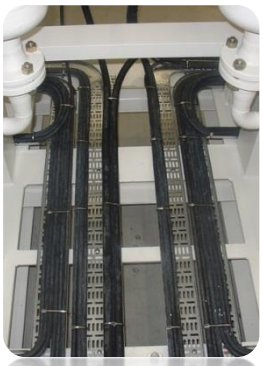
- Four point lifting frame with lifting lugs 100% MT tested

Removable lifting frame

Instruments and control:

- PLC based control panel with HMI
- API 520/521 relief valves
- ¼ " SS316L tubing with Swagelok SS316L double ferrule couplings
- Galvanized cable trays
- Flame retardant instrument cabling IEC 60332
- Brass EExd cable glands

LCP with HMI ***Eexd cable glands*** ***SS316L tubing*** ***Cabling & cable trays***



Certificates:

- 3.1 material certificates for:
  - ✓ Pressure retaining parts,
  - ✓ Lifting lugs.

Testing:

- Witnessed FAT (factory acceptance test)
  - ✓ Functional test

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Item	Scope of supply	Price Unit	EURO Total

C. Minimum recommended spare parts:

One (1) set commissioning/start-up
One (1) set for 2 year operation

Detailed description as per item 3.1 and 3.2.

Prices mentioned are only applicable ordered together with the package.

D. Costs for delivery FCA Airpack warehouse*
including seaworthy packing

*: ICC publication INCOTERMS 2020
For any seaworthy transportation open flatrack cargo is not allowed.
The quoted prices are excluding any local tax, import duties and other charges levied by the government or other authorized entity of the country of equipment destination. Any applicable charges should be borne by the purchaser.

E. Documents

The above prices are based on delivery of Airpack's standard documentation as mentioned in the Supplier Data Register.
Limited extra requirements can be included against extra costs.
Only one set of final "as built" documents will be submitted by courier.
Documents subject to approval during project stage will be submitted by email only.
Index and layout for all documents / reports and P&ID legend will be as per Airpack standard.

F. Scope of work:

Project management & Engineering for offered package
Manufacturing of offered package
Commissioning and start-up against daily rates
On request Airpack will provide technical training for one (1) day against reduced charge if training is performed at our workshop and combined with FAT. Travel, accommodation and personal cost to be borne by the customer.

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For more information regarding our product range, please visit our webpage at http://www.airpack.nl.

Should you require any other additional information, please do not hesitate to contact us.

Yours faithfully,
AIRPACK NEDERLAND B.V.

R. Dorreman
Sales Manager

C.c. J.P. Warnar
President

Bank details

Bank	: ABN AMRO
Account no.	: 52.29.886.36
IBAN	: NL45ABNA0522988636
BIC CODE	: ABNANL2A
VAT	: NL009414058B01

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TECHNICAL SPECIFICATION

Item	Qty	Description			
		The equipment will be installed outdoors, and shall be suitable for the climate conditions in an area with the following data:			
		Ambient temperature (min/max)			1 / 55 °C
		Relative humidity (min/max)			5 / 100 %
1.1	1	Gas compressor (1x100%, one operating)			
		Model			RBH-750
		Type			non lubricated, balanced opposed
		Acting			double
		Composition* (case 1/case 2)	77	70,2	% Propylene
			23	26,2	% Propane
				3,3	% Ethylene
				0,3	% Ethane
		tion pressure			2,8 / 3,5 bar(g)
		Suction temperature (min/max)			-10 / +60 °C
		Capacity			1200 kg/h
		Discharge pressure			21 bar(g)
		Discharge temperature (min/max)			76 / 97 °C
		Power absorbed			~ 57,8 kW
		Number of stages			two
		Cooling of cylinders			water cooled
		Piston speed			2,15 m/s
		Capacity control			0 to 100 % via by-pass line with control valve (by others)
		Safety valve			inlet, 1st, 2nd stage
		Sound pressure level			85 dB(A) at 1 meter distance
		Volumetric efficiency			0,88
		Type of valves			disc
		Pulsation dampers			at in- and outlet cylinders acc. to ASME VIII, div. 1
		Lubrication			pressurised via pump
		Piston/rider ring material			PTFE
		Drive			V-belt driven
		** The assumption is made that no liquids will enter the compressor and suction scrubber is provided by customer.*			
1.2	1	Oil cooler			
		Model			RBH-750-O
		Type			shell/tube
		Cooling			water cooled
		Oil filter and high pressure bypass			included

What is the revision of your design base documents?
The minimum temperature is 0 °C.
Please consider

noted: a suction drum is installed before compressor package to prevent any liquid inlet

Airpack 10-Apr-2024: Noted

Noted

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Item	Qty	Description
1.3	1	Intercooler

Model	RBH-750-I
Type	shell/tube
Cooling	water cooled

1.4 1 Electric motor

Speed	1485 rpm
Nominal power	75 kW
Enclosure	IP-55
Insulation / temperature rise	Class F / Class B
Power supply	400 V, 50 Hz, 3 ph
Power factor	0,85
Efficiency	IE2
Area classification	**Ex II 3G IIC T3, Ex'ec'**

1.5 1 Control system

The **UCP** will be of free standing type (IP-42) and will be located in customers control room (safe area). The UCP is **PLC** based and will be supplied with the necessary amount of start, stop, ESD, accept/reset push buttons, display, hour meter and following indication lamps:
- power on
- ESD
- common alarm
- common trip

PLC's are provided with hardwired connections for below signals.
Serial link connection on request.
Standard configuration: single, 19200 baud, parity: ODD
DCS is master, PLC is slave.

The UCP will be provided with text display with membrane keypad.

Following selector switches are included:
manual-off-auto switch

The following signals will be transmitted from **UCP** to customer control centre/ESD:
- common package alarm
- common package trip
- compressor running
- compressor operational
- dryer running
- dryer operational
- remote ESD
- remote package start/stop

A junction box is included with local/remote selection switch, start, stop, ESD buttons, maintenance switch and following indication lamps:
- power on
- ESD
- common package trip
- common package alarm

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TECHNICAL SPECIFICATION

Item	Qty	Description	
		All wiring will be termino**es** from which the interfacing by multicore (by others) to	
		Segregation in junction follows: digital signals oids analogue signals	
		All signals are connecte ion.	
		UCP panel classification	**safe area**
		UCP panel material	painted sheet steel
		UCP panel protection	IP-42
		Junction box classificati	**Ex II 3G IIC T3, Ex'e'**
		Junction box material	SS316
		Junction box protection	IP-65
		Control voltage	110 V, 50 Hz, 1 Ph

the area that this package is installed there, is zone 2. please clarify about safe area

Airpack 10-Apr-2024: Zone 2 is confirmed (refer junction boxes). PLC based UCP will be installed remote (indoor, safe area) as per normal practice and in line with previous supplied nitrogen compressor package.

1.6 1 Instrumentation

	Gauge	Alarm	Trip
<u>Pressure</u>			
Lube-oil	X		X
Inlet compressor	X		
Discharge 1st and 2nd stage	X		
Discharge compressor	X	X	X
Cooling water	X		
<u>Temperature</u>			
Discharge 1st and 2nd stage	X	X	X
Cooling water	X		X

The instrument area classification **Ex II 2G IIC T3, Ex'd'**

2 1 Skid

Item 1 is packaged together on one (1) skid, which will be supplied complete skid mounted and shop assembled with all piping, wiring, tubing, instruments and controls installed, to minimise installation labour.
The package shall be installed on the foundation by others.

Inlet of package	3" ANSI 150# RF
Outlet of package	2" ANSI 300# RF
Approx. dimensions (lxwxh)	4000 x 3000 x 3000 mm
Approx. weight	6500 kg

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Item	Qty	Description
3.1	1	Spare parts for commissioning and start-up Lot of valve parts Oil filter element
3.2	1	Spare parts for two (2) years operation Lot of piston rings and rider rings Lot of valve parts Gasket sets for compressor Oil filter elements

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DESIGN CONSIDERATIONS

1.	Description	Reference number	Rev	Pages
-				

2. We received the above mentioned specifications. We follow the specifications in the essence of its words, with the comments as mentioned below. Specifications not mentioned above are not received or considered by us. Therefore, cross-references made to specifications or drawings not mentioned above are not considered. Data as mentioned in our 'offer' is applicable as well as our engineering standards as written in our EPM.
3. New specifications other than the above mentioned submitted after handover from sales team to project team can be considered against extra costs or Airpack initiative.
4. Final deviation list and all clarifications exchanged shall become a part of the MR.
5. If applicable; delivery time shall only start from the moment the scope has been agreed between Customer and Airpack.
6. All discharge air pipe connections are welded by T-pieces, bends, couplings and flanges for necessary dismounting of items, such as safety valves, check valves, hand valves, etc. Pipe supports as per MFR STD. For gaskets we use flat, non-asbestos type.
7. All interconnecting piping, flanges and couplings will be of carbon steel (ASTM A-106 grade B or API-5L-Grade B for piping, A-105 for flanges and couplings). All valves are wafer type. Trunnion mounted valves are not included unless specifically mentioned in our additional items section.
8. All instrument tubing will be made of stainless steel tubing ¼", with compression double ferrule type couplings. All take off points of instruments will be ½" NPT for pressure instruments and ¾" NPT for temperature instruments. Control air tubing will be ¼".
9. Offered equipment is suitable for Ex II 3G IIC T3 acc. to IEC-60079-15.
10. Instruments will be of manufacturer's standard provided with 100 mm diameter indication. Transmitters are applied with exception of the dewpoint- and/or oxygen instrument, which is an analyser.
11. Transmitters will be supplied with aluminium housing, epoxy coated suitable for offshore applications. Readings are available on the control panel. Instrumentation connection is according to MFR STD (process connection = screwed NPT, electrical connection = metric).
12. Instrument hook-up as per MFR STD. Block and bleeds are not included.
13. Cable routing will be via galvanized cable trays with cover. Shrouds will not be used.
14. Panel manufacturer as per Airpack approved vendor list.
15. In the case only one suitable vendor is mentioned on a category of the project/customer AVL Airpack is obliged by international ISO rules to include a total of three (3) vendors. These will be selected from Airpack preferred vendor list.
16. With accepting of this offer by form of a Purchase Order, customer obliges itself to make Airpack acquainted with any local laws and regulations.
17. Overall sound pressure level of electrical motor driven package at 1 meter distance of package: 85 dB(A). Sound measurement as per Airpack EPM.
18. Interconnecting DIN flanges within the confines of the skid can be applied, however customer's connections will be according ANSI B16-5.

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DESIGN CONSIDERATIONS

19. Interconnecting piping, tubing, cabling, between separately delivered packages / skids etc. is not included in scope of supply.
20. Anchor bolts are not included in supply.
21. Design/calculations regarding foundation and anchor bolts is not included in our scope.
22. Skid design is according manufacturer's standard. Welding according to AWS D1.1.
23. Offered equipment will be painted according manufacturer's standard, i.e. two (2) layers of a two pack, high solids modified epoxy coating and one (1) layer of a two pack high solid, aliphatic polyurethane topcoat. Paint will be applied by roller / brush.
24. Welding and weld preparation will be executed according our third party approved procedures / qualifications belonging to the design code (if applicable).
25. All piping sizes are butt welded. Base layer and filling pass GTAW.
26. Applied PLC(s) is/are of Siemens or equal make and are suitable to operate in the severe weather conditions as mentioned in the 'Technical Specifications'. Any ESD relay is suitable SIL 2. Any other SIL requirements, fail safe or redundancy are not considered in this offer. Electrical equipment will be according to manufacturer's standard. Potential free contacts for signal interfacing will be provided.
27. When FF signals are applied, these cannot be tested at Airpack facilities. FF signals should be tested at site during commissioning.
28. In our policy of continuously improving our product, we preserve the right to re-engineer our installation within the confines of the skid at any stadium of the offer stage. After receipt of the purchase order, we will always ask permission of the customer to re-engineer our installation. The physical function of the re-engineered part within the installation will be maintained.
29. All equipment shall be installed under shelter. Direct sunshine on equipment is not allowed. Weather protection and sunroof to be provided by others.
30. Valve position panels or any other valve positioner indicators are not included in our scope of supply unless specifically mentioned in additional items.
31. The unit is not suitable to operate in ambient temperatures below 1 °C. We have not included anti condensation devices.
32. In case of conflicts about documents vendor shall report and solve them by agreement with buyer. Generally, the following ruling order applies:

First priority	Approved documents such as drawings and datasheets.
Second priority	Technical description and datasheets.
Third priority	Requisition and its other attachments.
Fourth priority	International standards and specifications.

33. Approved documents are binding.
34. Testing and inspection will be done in accordance with our Quality Test & Inspection Plan and Test & Inspection Procedure. These documents will be subject for approval after order.
35. ASME vessel material:
    < 24" vessel diameter = ASTM A-106 grade B or API-5L grade B
    > 24" vessel diameter = ASTM A-516 grade 70
36. The following witnessed tests will be carried out:
    - Functional test

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DESIGN CONSIDERATIONS

37. For NDT/NDE we have included only:
    - 100% MT for lifting lugs
38. The following material certificates to EN 10204 will be available:
    - 3.1 for pressure retaining parts and lifting lugs
    - 2.2 for base frame
39. We use the following programs:
    - Microsoft Office
    - Microsoft Project
    - Autodesk AutoCAD
    - Autodesk Inventor Professional
    - E-plan
40. For our delivery schedule, two factory visit days are considered for expediting. Additional visit days will be charged against our daily rates and have an influence on our delivery time.
41. Kick off meeting at Airpack premises or virtually (MS Teams or equivalent) is included in base price. Attending meetings at customer office (e.g. KOM, HAZOP, design review etc.) can be included against daily rates.
42. Requirements for supervision are against daily rates (for example: installation, start-up, commissioning, integration with existing equipment, etc.).
43. For changes in local legislation, regulations and/or other country specifics directly affecting the further progression of the project Airpack cannot be held responsible. If such occasion shall arise, both parties shall seek a resolution and establish a mutually agreed plan of action.
44. In case customer P&ID is to be followed this will be specifically agreed upon and mentioned in our offer. The same P&ID will be used to determine the final scope. Additional requirements outside this scope can be added against cost and delivery impact.
45. Gas detection and gas suppression system are not included.
46. Piston and rider rings are of Teflon (PTFE).
47. In order to avoid vibrations through the complete skid, Stainless Steel armoured flexible hoses are mounted from the compressor discharge to the solid skid piping.
48. Electric motor starters are not included in our scope of supply. Electric motor test certificate on request.
49. Cooler and pulsation bottle design as per MFR STD.

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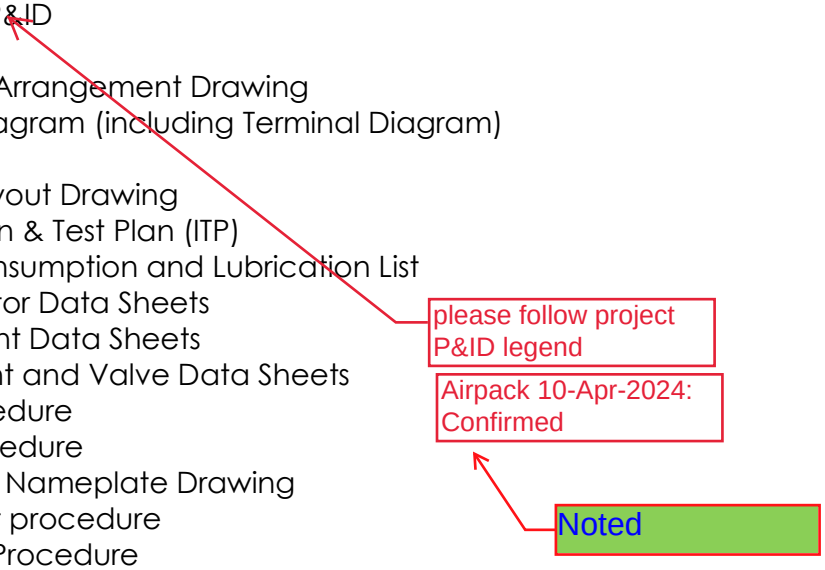
SUPPLIER DATA REGISTER

Document No.	Description
01	Vendor Document Schedule
02	Legend P&ID
03	P&ID
04	General Arrangement Drawing
05	Wiring Diagram (including Terminal Diagram)
06	I/O List
07	Panel Layout Drawing
08	Inspection & Test Plan (ITP)
09	Utility Consumption and Lubrication List
10	Main Motor Data Sheets
11	Equipment Data Sheets
12	Instrument and Valve Data Sheets
13	FAT Procedure
14	NDE Procedure
15	Package Nameplate Drawing
16	Hydrotest procedure
17	Painting Procedure
18	Index of Data Book
19	Index of Instruction and Operating Manual
20	Control Philosophy
21	Preservation, Packing & Shipping Procedure
22	Modbus list (if applicable)
	FOR INFORMATION ONLY
23	PQR / WPS
24	WPQ



Inspections and test according to Airpack standard quality plan are included. Additional approvals other than the purchaser, e.g. the end user, will be charged against costs.

Information and details are available based on Airpack document layout.

Native files are not available.

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CONDITIONS OF SALE

This offer is subject to Airpack order protocol. Airpack order protocol will be available on request after receipt of technical approval for our offer.

1. **CONFIDENTIALITY**

All drawings, specifications and technical information provided by the company to the customer are the company's copyright.
The mentioned documents and technical information are confidential and remain the property of the company at all times and the customer shall not (without the previous written consent of the company) copy and such drawing, specifications or technical information, nor show, disclose or give to any third party or communicate the content thereof to any third party or use them in any way otherwise when for the purpose of adjudicating the offer to this contract or for the operation of the goods supplied.

2. **SEAWORTHY PACKING**

Seaworthy packing generally complies with our drawing TDMW - 103 as per below and consists of a removable packing frame of steel covered with underlayment with wooden support of 2 x 3 inch beams. Each critical item will be protected by a separate plastic cover. Switchbox will be filled with desiccant to avoid oxidation.

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