Your ref.: C800-RAMB-M-SA-0001

Our ref.: WI-13-153 rev01

Date: 11-03-2014



Detailed Proposal (technical & commercial)

Design, Materials, Fabrication, Inspection, Testing and Supply

of

One (1) Shell & Tube Heat Exchanger

for the

'GORM E' Project

for

Maersk Oil

LEADING IN OIL & GAS TECHNOLOGY

Dear Mr Christensen,

With reference to afore mentioned RFQ, please find herewith our revised proposal for the design and supply of One (1) Shell & Tube Heat Exchanger for the 'GORM E' Project for Maersk Oil.

In this revised proposal we included the technical & commercial issues discussed by email with you and your technical department.

In case of any further question, please do not hesitate to contact.

Trusting to have served you with a technically and commercially attractive offer we remain,

Yours sincerely,

NRG HEAT EXCHANGERS B.V.

Gerard Tuin

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TABLE OF CONTENTS

Attachment(s):

- NRG DATASHEET-rev02

1 COMPANY INFORMATION

1.1 Introduction

Since 1995, NRG Heat Exchangers B.V. has been designing and manufacturing high quality Shell & Tube Heat Exchangers and Air-cooled Coolers for the international oil & gas, (petro-) chemical and power generation industries. In 2010 we joined forces with Frames to strengthen our international position and potential.

1.2 Key assets

Our highly trained and experienced engineers and welders have access to the latest software packages, state-of-the-art workshop and a large knowledge and experience database. Together with an ambitious attitude and a motivating work environment, we ensure optimal thermal & mechanical design for any project. Combined with a flexible organization and a worldwide sales and distribution network, NRG has all the means to deliver market leading product to internationally operating customers.

As part of Frames, NRG is now able to execute larger projects and participate in total system design and optimization. We are only content with maximum results for our customers, proven by our full thermal and mechanical guarantee that we deliver on all supplied equipment.

1.3 Shell & Tube Heat Exchangers

When a fluid stream requires cooling, condensing, heating or evaporation Shell & Tube Heat Exchangers are used. Compared to other types of heat exchangers, the shell and tube have practically no limitations in operating pressure and temperature. They also excel in availability, reliability, durability and easy maintenance. NRG is specialized in engineering and manufacturing all available TEMA types, either vertical or horizontal. We offer mechanical solutions for fouling applications and occasionally apply tube inserts to improve tube-side heat transfer and reduce tube-side fouling. Our engineers calculate exact sizing and advise our clients during the selection of materials to guarantee optimal efficiency and lifespan.

1.4 Air-cooled Coolers

These heat exchangers offer fast and efficient fluid-to-air cooling/condensing in process systems where no or insufficient cooling fluid is available. They are also favoured because of their economical and operational advantages as they are less reliant on complex fluid cooling and conditioning systems. In our quest for maximizing market potential, we offer forced or induced draft coolers including several options such as low noise fans, louvers (automatic/manual operated), heaters (electrical/conventional), variable speed drive systems, vibration switches & accelerometers, cabling provisions and hot air recirculation cabinets.

1.5 Quality assurance

The continuous improvement of our technical knowledge, product quality and our organization ensures that we can support our clients even better. A solid basis is created by the expertise and experience of our people. Our quality management system in accordance with ISO 9001:2008 and approved by Lloyd's provides the formal support. Recently our certificate has been extended with the requirements of ISO 3834-2:2005 'Welding Controls'.

NRG Heat Exchangers B.V. is authorized by the American Society of Mechanical Engineers to design and build Shell & Tube Heat Exchangers, Pressure vessels and Air-cooled Coolers in accordance with the requirements of the ASME Boiler and Pressure Vessel .

2 DOCUMENT BASIS FOR QUOTATION

2.1 Applicable Specifications

This proposal is based on following specifications.

Document title	Document nr.	Rev.
Instruction to Tenderers		
Technical Specification Recycle Cooler, GEA-E3680		
Maersk Oil&Gas GTC 1210		
User Instructions	TS-00	
Pressure Vessels	MOTS-05	
Welding and NDE of Welds	MOTS-12	
Materials and Fabrication of Topside Modules and Bridges	MOTS-31	
Protective External Coating of Steel	MOTS-34	
Weight Control	MOTS-35	

In case cascading documents of project specific specifications are mentioned and these are not listed in the above listing, those documents have not been taken into account.

2.2 International Codes and Standards

We have applied following codes and standards for the design of the applicable equipment and their materials of construction where applicable.

- PED 97/23/EC
- ASME VIII div.1 (Not Stamped)
- API660
- TEMA R

The selection of subject codes and standards is performed in line with the requirements as mentioned in client documents.

3 PRICES AND SCOPE OF SUPPLY

3.1 Base Scope of Supply

Item	Qty.	Description	Total Prices
1	1	S&T Heat Exchanger GEA-E-3680 – TEMA type AFM	€ 72.800,-
2	1	Third Party Verification Bureau Veritas	€ 13.400,-
		LUMP SUM	**€ 86.200,-**

Options			
3A	LOT	Additional Shell + Tube Bundle - Ordered together with complete heat exchanger	€ 40.200,-
3B	LOT	Additional Shell + Tube Bundle - Ordered at later then complete heat exchanger	€ 57.600,-
4	LOT	Preservation (Nitrogen filling)	€ 1.300,-
5	LOT	Packing	€ 3.800,-
6	LOT	Spare parts for 2 year operation	€ 1.100,-

3.2 Scope Inclusions

Furthermore the following is included for

- Thermal & mechanical design, engineering, purchasing of materials, (sub-contracting of) fabrication, testing & inspection and delivery for the items part of the scope of supply
- Design and Engineering includes:
  - Thermal design using HTRI or HTFS
  - Strength calculations to the applicable code
  - Lifting lug calculations, calculation of maximum allowable nozzle loads
  - Foundation loads calculations
- Fabrication, Testing & Inspection includes:
  - Quality control at receipt of materials in shop and during fabrication
  - Machining of parts
  - Welding and heat treatment (PWHT) to the applicable code
  - Assembling
  - Non-destructive examination (NDE) and Hydro-testing to code
- Surface treatment for all equipment
- Material Certificates: 3.1 EN 10204 mill certificates for pressure parts
- Inspection cost for Notified Body
- One (1) set of documentation according below mentioned listing:
  - General arrangement drawing
  - Detailed drawings
  - Mechanical design calculations
  - Manufacturing record book / Installation & Operation Manual

  On request we can include for additional documentation. Submittal dates to be agreed later.

- Shell & tube Heat Exchanger(s):
  - Frontal head, rear head, shell and tube bundle
  - Bolts & nuts and gaskets
  - Vent & drain for shell side including blind

- Relieve valve connections for shell (bursting discs excluded)
- Hydro test equipment is limited to studs & nuts, gaskets and blind flanges

3.3 Scope Exclusions

The following is currently not included for

- All items not clearly mentioned in scope of supply
- Anchor bolts, templates, welding for installation of the equipment on site
- Insulation (where required), clips and supports
- HAZOP study and management
- Additional equipment due to the HAZOP study other than safety related, if any
- Interconnecting piping in between exchangers and to existing equipment
- Fire Proofing
- Shims for levelling heat exchangers on site
- Wiring and junction boxes
- Instrumentation
- Bursting discs
- Lifting facilities

4 TECHNICAL SUMMARY

4.1 Thermal & Mechancial Design

The thermal design is based on client datasheets attached to your enquiry. Please see attached datasheets for a summary of the process data and mechanical data.

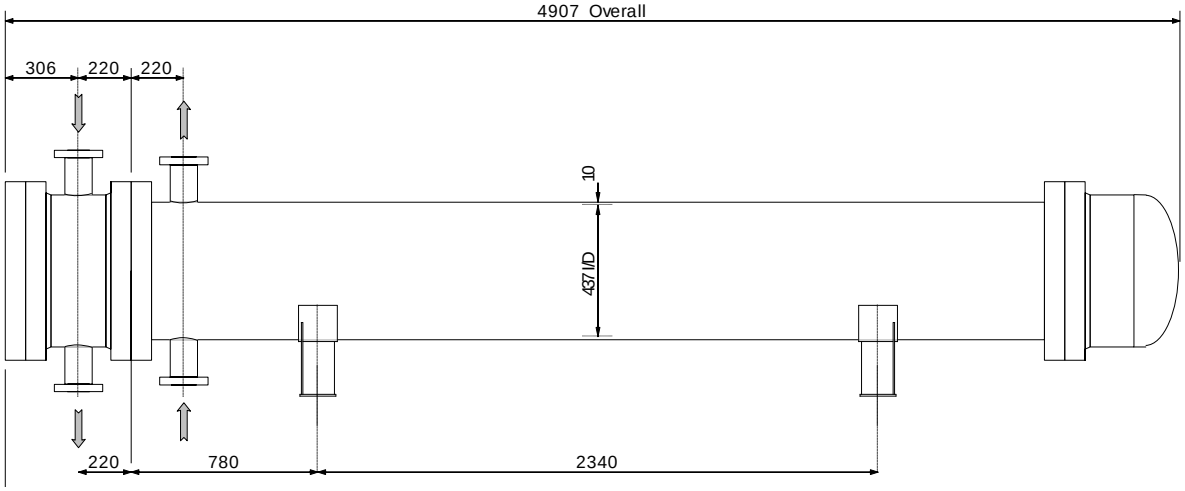
4.2 Technical Details

Please find below important technical details:

- TEMA-type: AFM
- Tube-to-tubesheet joint: Double grooved + expanded
- Only connections for relief valves are included (bursting discs etc. are excluded)
- Environmental conditions:
    - Ambient temperature: -10 / 22 degree Celsius
    - Relative humidity: 80 – 100%
    - Saliferous atmosphere
- Hydro test equipment is limited to studs & nuts, gaskets and blind flanges
- Spare parts for 2 year operation are offered as an option:
    - 2 gaskets for each
    - 10% of bolts and nuts

4.3 Main Dimensions

Please find below our setting plans showing basic dimensions. Dimensions are for information only; final dimensions will be determined during detailed engineering stage.



Estimated weight = 4500 kg

4.4 Inspection and Testing

The Third Party Verification / Inspection of Bureau Veritas is included as discussed by email. In our price we included the following as agreed by email:

- Attendance of BV at KOM (incl. traveling + accommodation)
- Witnessing FAT incl. final inspection (incl. traveling + accommodation)
- Examination of documentation
- Issue of certificate of approval and URN

All non-destructive examination will be carried out in line with the applicable design code.

4.5 Conservation, Packing and Marking

During hydro-testing corrosion inhibitor is added to the test water. Demineralized water will be used for hydro-testing. After the test the equipment will be drained and dried. All nozzles will be provided with wooden plates for protection during transportation.

4.6 Nozzle loads

The allowable forces and moments on each nozzle will be calculated according Appendix 2 of the Technical Specification.

4.7 Surface treatment

Three-layer paint system, insulation by others

5 REMARKS AND DEVIATIONS

- Please see section 3.2 / 3.3 for scope inclusions / exclusions
- Our standard PQR and WPS (according ASME) will be used during fabrication

6 COMMERCIAL TERMS & CONDITIONS

- Warranties - There are no warranties established herein, implied or statutory, except those expressly stated.

- Guarantees - Goods are guaranteed for a period of 12 months after start of operation or 18 months after delivery, whichever period ends first. Exceptions to guarantee; NRG will not accept charges for labour, or any other costs to enable access / clearance to the NRG supplied equipment required for proper remedial activities in case of defective materials.

- NRG will not accept costs for repair or replacement effected by or on behalf of the client unless otherwise agreed upon in writing.

- Limitations of Liability – Without prejudice or limitation to any of Supplier's indemnity obligations in clause 4, 8, 9 and 11 of the GTC of Maersk, suppliers liability shall be limited to 110% of the total Order Value. NRG will not be liable, in any case, for consequential or secondary damages.

- Duties and Taxes - Prices given are exclusive of all taxes, duties, government fees, VAT, etc.

- Validity - 14 days

- Extent of Supply - Ex works workshop Netherlands

- Delivery Time: 34 weeks, delivery time is based on firm written order placement. A document turnaround time of two weeks is considered. These delivery times are subject to discussion for implementation into clients project schedule.

- Terms of Payment - 30 days net
    - 95% upon delivery of the goods including Third Party Unconditional Release Note
    - 05% upon delivery of the Third Party approved Final Documentation

- Costs related to acceptance of Liquidated Damages, Bank Guarantees, Advance Payment Bank Guarantees, Letter of Credit documents and/or Performance Bonds are not accounted for and therefore these constructions do not apply to previously stated pricing scheme. Inclusion of these aspects is subject to discussion.

- "Time is of the Essence" will not be applicable to any contract resulting from this proposal. Clause 6 of the GTC will be replaced by a penalty for late delivery. Agreed penalty is 2.5% per week with a maximum of 10%.