

	Specification	Technology
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Title: **Duvha Power Station Technical Specification for Boiler Auxiliary Cooling Heat Exchanger Refurbishment for period of 5 years**

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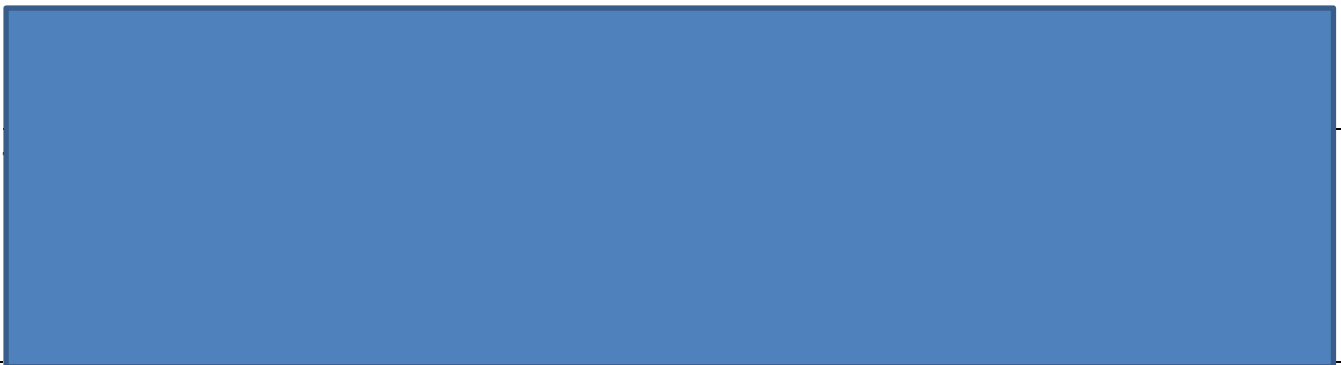
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EXECUTIVE SUMMARY

Boiler Auxiliary Cooling Heat exchanger refurbishment contract for a period of 5 years at Duvha Power station. The scope of work include stripping, assembling, replacement and cleaning of plates and replacement of the gaskets, reinstalling and commissioning of the heat exchanger for unit 1 to unit 6. Work instructions during this period shall be provided by means of task order of which the value will be based on a bill of quantities price list as agreed upon by this contract.

1. INTRODUCTION

Duvha Power Station has six units and each unit consist of Boiler Auxiliary Colling system. The boiler auxiliary cooling system supplies de-mineralised water via a closed circuit system to the boiler and turbine plant to provide cooling for bearings, oil coolers, samplers, etc. The returning hot water is then cooled in two banks of heat exchangers deriving their cooling water from the main cold CW ducting in the turbine basement. The CW from the heat exchangers returns to the main hot CW ducting also in the turbine basement.

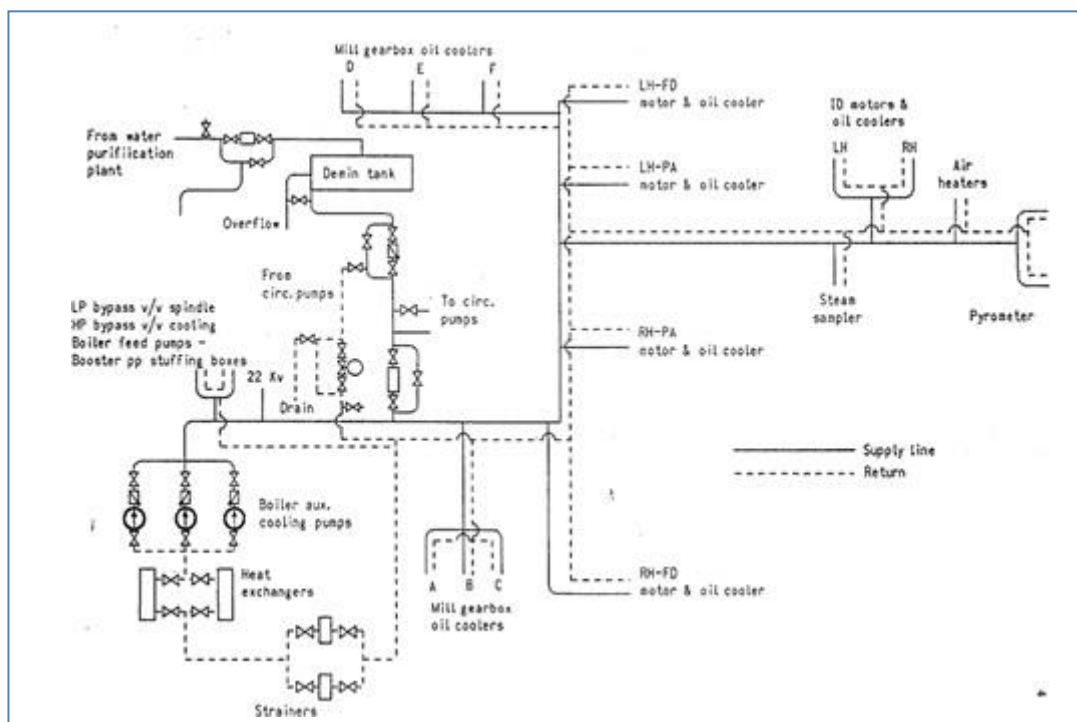


Figure 1: Boiler Auxiliary Cooling system

The heat exchangers that are installed in the BAC are plate type heat exchangers. Plate heat exchangers consists of a pack of corrugated metal plates with portholes for the passage of the two fluids between which heat transfer will take place.

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2. SUPPORTING CLAUSES

2.1 SCOPE

This document covers the technical specification for the scope of the works. The scope covers the five years contract refurbishment for BAC heat exchanger in Duvha Power Station. The scope of work to be delivered by the Contractor is defined in this document.

2.1.1 Purpose

The purpose of this document is to describe in detail the scope of work for Boiler Auxiliary Cooling Heat Exchanger Refurbishment with all services prescribed herein to be delivered by an appointed contractor.

2.1.2 Applicability

The document is applicable to the following departments: Auxiliary engineering, Maintenance (HMD), Operating, Production, Engineering and Design and Specification.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] Instructions for ALFA-FLEX plate heat exchangers (OEM manual)
- [3] 240-107981296, Constructability Assessment Guideline
- [4] 32-727 - Eskom Safety, Health, Environment and Quality (SHEQ) Policy

2.2.2 Informative

- [5] 474-58 (Rev1): Document and Records Management
- [6] 240-53113685, Design Review Procedure
- [7] OTS 02403 Boiler auxiliary cooling system operating manual

2.3 DEFINITIONS

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
CoM	Certificate of Manufacture
ISO	International Organisation of Standards
SANS	South African National Standards
SHEQ	Safety, Health, Environmental & Quality

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Abbreviation	Description
SE	System Engineer
PHE	Plate heat exchanger
PSR	Plant Safety Regulations
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan

2.5 ROLES AND RESPONSIBILITIES

Power Station: It is the role of the Power Station to follow the necessary processes to appoint the Contractor(s) for the works stated herein.

System Engineer (SE): It is the role of the System Engineer to ensure that this scope is executed accordingly and ensure all the work is done as per specification.

Project Manager (PM): It is the role of the Project Manager is to manage the project and ensure all works are being executed with accordance to the contract agreement between the client and the appointed contractor.

Contractor: It is the role of the Contractor to conduct the works in accordance with the details provided in this document and adhere to all the terms in the contract.

3. SYSTEM DESCRIPTION

3.1 BACKGROUND

The BAC system has three major components which are the pumps, heat exchangers and the pipe network. Each unit has 3 pumps and 2 heat exchangers. Only one pump and one heat exchanger are required to be in service to achieve full load. The heat exchanger set has duplex strainers that can be removed for cleaning by bypassing it. One strainer will be bypassed and the other one will be in use. The boiler auxiliary valves can only be opened and inspected during major outages. Each unit has one demineralised water head tank that requires an outage for cleaning.

Table 1: The primary design of the system is as follows:

Piping	Mild steel and Stainless steel in the trenches	
Pumps	130l/s at a discharge head od 32.4m	
Heat exchanger	Process Side	Service Side
Inlet temp	46°C	32°C
Outlet temp	40°C	40°C

3.2 HEAT EXCHANGER SPECIFICATIONS

The heat exchangers that will be refurbished in the BAC will be plate type heat exchangers. Plate heat exchangers consists of a pack of corrugated metal plates with portholes for the passage of the two fluids between which heat transfer will take place. When a package of plates are pressed together, the holes at the corners form continuoustunnels or manifolds, leading the media (which participate in the heat transfer process)

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from the inlets into the plate pack, where they are distributed in the narrow passages between the plates.

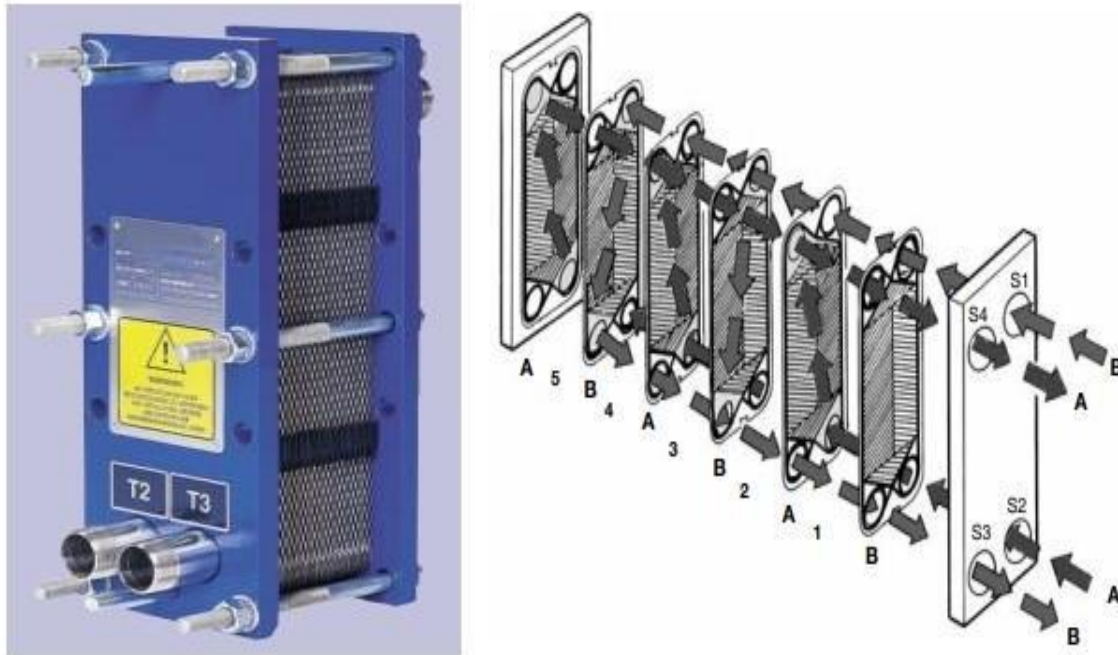


Figure 2: Plate Heat Exchanger

Because of the gasket arrangement on the plates, and the placing of “A” and “B” plates alternately, the two liquids enter alternate passages, e.g. the warm liquid between even number passages, and cold liquid between odd number passages. See figure 2.

Thus the media are separated by a thin metal wall. In most cases the liquids flow in opposite directions.

During the passage through the PHE, the warmer medium will give some of its heat energy to the thin wall, which instantly loses it again to the colder medium on the other side.

The warmer medium drops in temperature, while the colder one is heated up.

Finally, the media is led channels at the end of the plates and discharged from the heat exchanger. Table 2 below represent the plate heat exchanger specifications and Appendix A

Table 2: Plate heat exchanger specifications

	Closed Circuit (Demin)	Open Circuit (Cooling water)
Parameter		
Flow Rates (l/s)	468	350
Inlet Temperature (°C)	46	32
Outlet Temperature (°C)	40	40
Specific gravity	0.99	0.992

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Specific Heat (kgCAL/kg°C)	0.997	0.998
Viscosity (Cst)	0.622	0.709
Operating pressure (kPa)	900	
Pressure Drop (kPa)	100	50
Maximum Working Temperature (°C)	110	
Plate Material	AiSi 316 Ti	
Gaskets	Nitrile Rubber	
Frames	ASTM A 516 Gr60	
Number of Plates	133	

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4. DETAIL SCOPE OF WORK

SUBSYSTEM		BOILER AUX COOLING SYSTEM					
COMPONENT ACTIVITIES					GOVERNING DOCUMENTS		PRIORITY
QTY	COMPONENT FLOC (AKZ CODE)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECTION / TEST / REFURBISH / REPLACE)	WORK SPECIFICATIONS	CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)	.
1	VD01G001	Heat Exchanger A	Strip, inspect, replace, reassemble and test/commission	Plate Heat exchanger: "A" to be Dismantle, remove, clean, inspect, do dye penetrant test and install plates and replace damage plates, Inspect plates for corrosion and fouling as part of the scope the Contractor must supply gaskets. Inspection report must be provided.	Instructions for ALFA-FLEX plate heat exchangers (OEM manual)	H	1
1	VD01G002	Heat Exchanger B	Strip, inspect, replace, reassemble and test/commission	Plate Heat exchanger: "B" to be Dismantle, remove, clean, inspect, do dye penetrant test and install plates and replace damage plates, Inspect plates for corrosion and fouling as part of the scope the Contractor must supply gaskets. Inspection report must be provided.	Instructions for ALFA-FLEX plate heat exchangers (OEM manual)	H	1

4.1 GENERIC HEAT EXCHANGE REFURBISHMENT SCOPE OF WORK

The *Contractor* to provide verifiable references with contact details, description of work completed, and date executed for three (3) references of projects within the last two (2) years involving the inspection and maintenance (cleaning, repairing of plate type heat exchangers). As part of the tender submission the contractor must provide a list of exclusions or deviations to the scope of work as detailed in this document. *Contractor* will submit a site specific required for all proposed key personnel, including all sub-*Contractors*. Qualifications and capabilities of any sub-*Contractors* must also be organogram specifically stating names, positions and as part of tender submission, experience and proof of qualifications of personnel that will be responsible for executing work. The following are required as a minimum:

1. Appointed Site Manager/Representative with 3 years of experience skills (CV)
2. Competent site supervisor with more than 3 years of experience (CV).
3. QTY of Artisans to have more than 1 years of experience.
4. QTY of skilled and semi-skilled labour force (CV)
5. QA/QC manager with 1 years of experience (CV)
6. Safety officer with 1 years of experience (CV)

4.1.1 Heat Exchanger Refurbishment Scope of Work

1. The contractor should ensure the safety of the area before dismantling the heat exchanger.
2. The Employer will isolated the system and ensure that system is de-energised.
3. The *contractor* will ensure that there is no pressure on any part of unit prior to dismantling and that the system has been isolated and permit to work is in place
4. The *contractor* to allow the heat exchanger unit to cool down to temperature below 40°C
5. The *contractor* is responsible to drain all heat exchanger circuits (hot and cold circuits)
6. Prior stripping the heat exchangers, the *contractor* is responsible to measure and record the plate length between the fixed and mobile heads
7. It is the responsibility of the *contractor* to use correct tools during scope of work execution
8. The *contractor* is responsible for disconnecting the pipes at the back of the tie-rods
9. The *contractor* to inspect the sliding surfaces of the carrying bar and wipe clean
10. *The contractor is responsible to inspect the pressure plate roller for any defects*
11. *The contractor to pull back the plastic covers on the tightening bolts; brush the threads clean with a steel wire brush.*
12. *The contractor is responsible to clean and lubricate all bolts, threads and tie-rods with a thin layer of thread lubricant prior to stripping*
13. *The contractor will uniquely mark the plate assembly with a spray paint on the outside by a diagonal line or number the plates in sequence.*
14. *The contractor is required to verify all dimensions of replacement plates and compare it to figure 3 below:*

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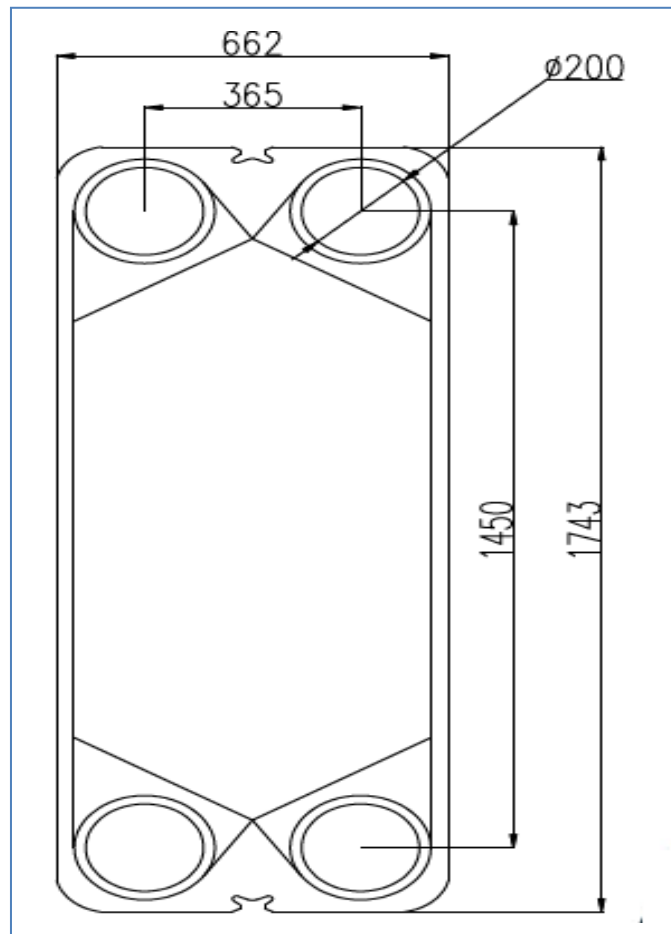


Figure 3: dimensions of replacement plates

15. The contractor is responsible to loosen tie clamping bolts alternatively and diagonally to bring length to 1.05"A" (see figure 4) until the plate pack is loosened.
16. It is the responsibility of the contractor to check the dimension "A" during tightening at the positions of the bolts that are being used (refer to figure 4). Skewing of the pressure plate during tightening must not exceed 10mm (2 turn per bolt) across the width and 25mm (5 turns per bolts) vertically

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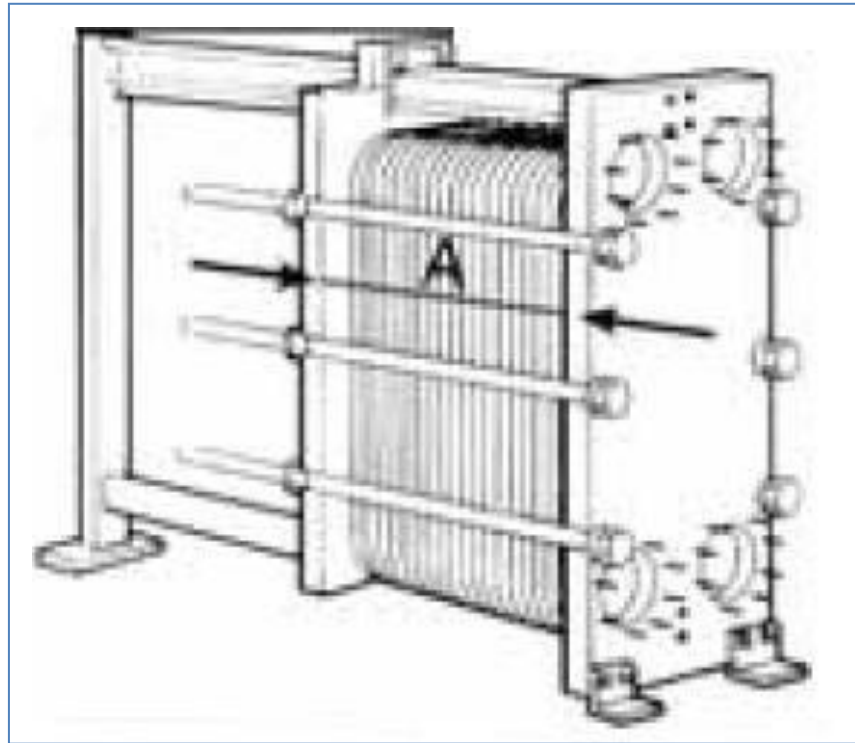


Figure 4: "A" Length of the plate heat exchanger

17. The *contractor* is responsible to supply a method statement for execution of heat exchanger refurbishment (stripping, assembling, and replacement, cleaning of the plates).
18. The *contractor* pulls the follower back towards the column and remove the plates without damaging the gaskets
19. The *contractor* is liable to transport all the equipment from site to workshop and back to site.
20. The *contractor* ensures that equipment is not damaged during transportation
21. The *contractor* submits a preliminary program with tender submission clearly indicating the program for stripping, assembling, replacement and cleaning of plates and replacement of the gaskets, as this is a 5 year contract the program will be typical per unit outage intervention.
22. *Contractor* will supply all gaskets, plates, bolts and nuts to execute the works. All bolts and nuts will be cleaned; any damaged bolting will be replaced by the *contractor*
23. It is the responsibility of the contractor to verify the performance of the heat exchanger after the refurbishment.
 - Check the temperatures and flows
 - Check general condition and look for any signs of leakage
 - Wipe clean all painted parts and check surfaces for signs of damages
 - Check bolts and bars for rust and clean. Lightly coat threaded parts with molybdenum grease or a corrosion inhibitor (ensure that no grease etc. falls onto the plate gaskets)
 - If rollers are fitted to the followers, lubricate the bearings with light machine oil
24. The *contractor* is responsible to submit all Quality Control Plans (QCPs), program of work, manpower list for approval before commencement of work

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25. Should the contractor not perform dye penetrant testing of all plates to check for pin holes when plates are cleaned before re-assembly. Surely you need to check that plates are not holed or cracked as it will for sure influence the performance and reliability?

4.2 THE CONTRACTOR WILL BE REQUIRED TO PERFORM ALL ACTIVITIES AND REPAIRS AS PER THE APPROVED METHOD STATEMENT.SAFETY REQUIREMENTS

- Contractor employees must complete Duvha Safety Induction Course, before any work can be executed.
- Risk assessment and Pre-job brief shall be conducted by Contractor Supervisor with all his employees. Copies shall be handed over to the client.
- No work shall be executed without an approved QCP and method statement from the contractor.
- No work shall be performed without a Permit to Work. Domestic installations are exempted.
- No work shall be performed without pre-arrangement with the project manager.
- All other spares, materials and safety equipment needed to do the test, shall be supplied by the Contractor. Contractor to include an itemised bill of materials in price list as part of tender.
- All required Personal protective equipment (PPE) must be worn all the time.
- All Eskom's and other safety rules must be adhered to all the time.

4.3 QUALITY REQUIREMENTS

The Contractor responsible for heat exchanger refurbishment is to do as much preparatory work as possible before commencement of the outage.

No work shall commence before the approval of the QCP. The Contractor is expected to compile the QCP document and submit it to the Employer for review and approval. The Contractor is also expected to thoroughly comply with standard: 240-105658000 Supplier Quality Management Specification. Find the standard attached. The following shall be submitted to the Project Manager before work commence;

- Method statements and specifications adhered to;
- Material Certificates;
- Calculations for any temporary works that may be required for the safe execution of the works;

5. PRICE LIST OF MATERIAL

The Price List is as follows and also as per notes contained in SOW (Scope of Work)

Refurbishment of the Heat Exchanger Plates A and B on Unit 1 to 6 during Outages

Item No.	Description	Unit	Quantity	Rate	Price
A	Activities to be Performed				
1.1	Stripping and cleaning of Heat Exchanger Plates A and B consisting of 133 plates on each Heat Exchanger	Ea	2		
1.2	Replace old AM20 gaskets with new gaskets (2 sets for 133 plates each)	EA	2		
1.3	Replace damaged Heat Exchanger plates with new ones	Ea	1		
1.4	Installation of Heat Exchanger plates on-site	Ea	2		
	Sub-total (A)				

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B	Preliminaries and Generals				
2.1	Transportation	Ea	1		
2.2	All Safety and Health Requirements including Quality	Ea	1		
2.3	Operational performance test after overhaul	Ea (complete unit)			
2.4	Dye penetrant testing of all plates per heat exchanger	Set			
	Sub-total (B)				
	The total of the Prices (excluding VAT):				

6. HANDOVER

The Contractor also compiles a data package of the relevant drawings, test certificates etc. to the Project Manager for acceptance. These include, but are not limited to:

- Document List;
- Instruction for Work/ Purchase Order;
- Approved and signed off ITP's, QCP's;
- Completed visual and pressure test reports
- All damage noted during visual inspections will be backed up with photographic evidence included in inspection reports
- Method statement
- NDT test reports
- Performance testing.

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7. TENDER STRATEGY REQUIREMENTS

7.1 QUALITATIVE TECHNICAL EVALUATION CRITERIA FOR ALL SECTIONS:

Table 1: Qualitative Evaluation Criteria Score Scale

Score	(%)	Definition
5	100	COMPLIANT Meet technical requirement(s) AND; No foreseen technical risk(s) in meeting technical requirements.
4	80	COMPLIANT WITH ASSOCIATED QUALIFICATIONS Meet technical requirement(s) with; Acceptable technical risk(s) AND/OR; Acceptable exceptions AND/OR; Acceptable conditions.
2	40	NON-COMPLIANT Does not meet technical requirement(s) AND/OR; Unacceptable technical risk(s) AND/OR; Unacceptable exceptions AND/OR; Unacceptable conditions.
0	0	TOTALLY DEFICIENT OR NON-RESPONSIVE

Note 1: The scoring table does not allow for scoring of 1 and 3.
 Note 2: Foreseen acceptable and unacceptable risk(s), exceptions and conditions shall be unambiguously defined in the relevant Tender Technical Evaluation Strategy.

8. TENDER STRATEGY REQUIREMENTS HEAT EXCHNAGER REFURBISHMENT

8.1 MANDATORY REQUIREMENTS FOR HEAT EXCHANGER REFURBISHMENT

The following mandatory requirements will apply with respect to heat exchanger refurbishment. The *contractor* must supply each of the items below, as if not the tender will be nullified.

Tender returnable:

1. The *contractor* to provide verifiable references with contact details, description of work completed, and date executed for ONE (1) references of projects within the last TEN (10) years involving the inspection and maintenance (cleaning, repairing and handling plate type heat exchanger) as specified in section 4.1.
2. The contractor to submit a method statement including all section of the scope of work stated in section 4.14.1 and all the subsections 4.1.1.

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8.2 QUALITATIVE REQUIREMENTS FOR HEAT EXCHNAGER REFURBISHMENT

Tender returnable required to allow for Qualitative evolution as below:

1. *Contractor* will submit an organogram of all site Key personnel, including all sub-*Contractors* for activities as specified in section 4.1.
2. Exclusions to the actual scope of work as defined, if no exclusions a clear statement to be provided that complete scopes is accepted 4.1
3. The *contractor* is responsible to submit all Quality Control Plans (QCPs), program of work, manpower list 4.1 for approval before commencement of work as specified in section 4.1

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Technical Evaluation Criteria for Heat Exchanger Refurbishment						
No	Weight	Qualitative Criteria Description	Technical	Evaluation Scoring Breakdown		
				0	2	4
1	20	Contractor will submit an organogram of all site Key personnel, including all sub-Contractors for activities as specified in section 4.1.	No organogram , Qualifications and capabilities of any sub-Contractors including CV's	Company Organogram submitted without key personnel Qualifications and capabilities of any sub-Contractors including the CV's	Company Organogram submitted with key personnel Qualifications or CV's but failure to submit Qualification or CV's	Company Organogram submitted with key personnel Qualifications and capabilities of any sub-Contractors including the CV's
2	60	Exclusions or non- acceptance of sow of work requirements (Section4.1.1)	Exclusion statement provided	Unacceptable exclusions	Acceptable exclusions with no technical risk on project	No exclusion statement provided
4	20	Supply typical QCP as per section 4.1 with the required deliverables	None Provided	Not includes all Key activities in section 4.1.1 - leading to unacceptable risks	Comprehensive QCP with some commissions but acceptable	The QCP includes all activities in section 4.1.1

NB: A minimum total of 70% is required in this section for further consideration

9. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation

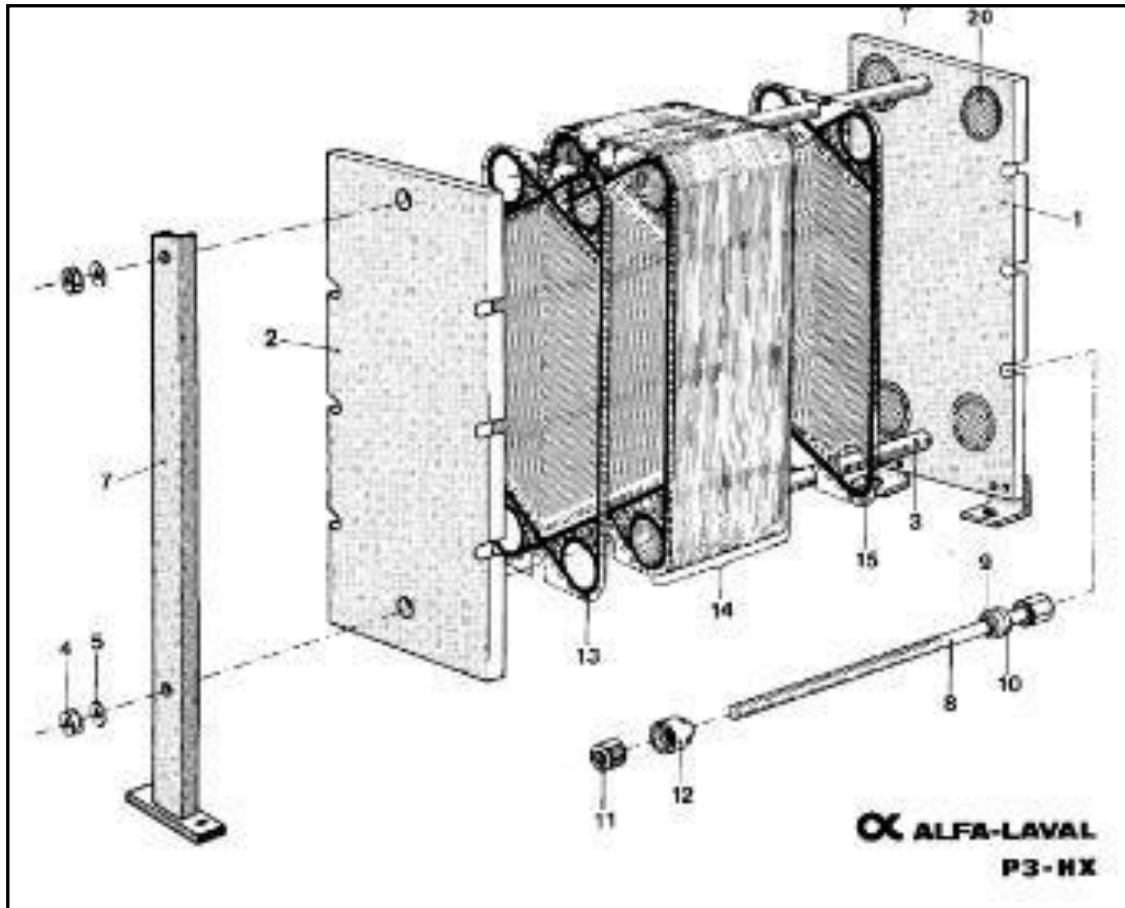
10. REVISIONS

Date	Rev.	Compiler	Remarks

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FRAME PARTS

Alt	Pos	Qty	Description	Alfa-Laval Part number
1	1	1	Frame plate (GIN 7501 HT 10)	32263-0400-1
2	1	1	Frame plate (ANST 150)	32263-0400-2
1	2	1	Pressure plate with holes for connections	32263-0403-1
	2	1	Pressure plate without holes for connections	32263-0402-1

3 2 CARRYING BAR

Length	Part number	
	Stainless steel 13 Cr	Stainless steel 25 Cr 5 Ni 1.5 Mo
750	32263-0410-1	32263-0418-1
850	32263-0410-2	32263-0418-2
1000	32263-0410-3	32263-0418-3
1375	32263-0410-4	32263-0418-4
1750	32263-0410-5	32263-0418-5
2125	32263-0410-6	32263-0418-6
2500	32263-0410-7	32263-0418-7
L (order bound length)	32263-0410-8	32263-0418-8

REQUIRED FOR EACH CARRYING BAR

4	2	Nut (M24)	221803-36
5	2	Washer BMS 25 x 45	221801-55
1		Supporting leg (for carrying bar L ≥ 2125)	32263-0409-1
7	1	Supporting column	32263-0412-1
8	6	TIGHTENING BOLTS	

Material	Length mm	Part number Dimension M30	Material	Length mm	Part number Dimension M30
Stainless steel	750	32239-1139-1	Stainless steel 26 Cr 5 Ni 1.5 Mo	750	32239-1147-1
	1050	32239-1139-2		1050	32239-1147-2
	1350	32239-1139-3		1350	32239-1147-3
	1650	32239-1139-4		1650	32239-1147-4
	1950	32239-1139-5		1950	32239-1147-5
	2250	32239-1139-6		2250	32239-1147-6
	2550	32239-1139-7		2550	32239-1147-7
	L (order bound length)	32239-1140-1		L (order bound length)	32239-1148-1

REQUIRED FOR EACH TIGHTENING BOLT

Bolt dimension M30, 2244-64

9	1	Guide washer	32239-1146-1
10	1	Thrust washer	32239-1145-1
11	1	Nut	32239-1144-1
12	1	Lock washer	32239-1143-1

Bolt dimension M30 (25 Cr 5 Ni 1.5 Mo)

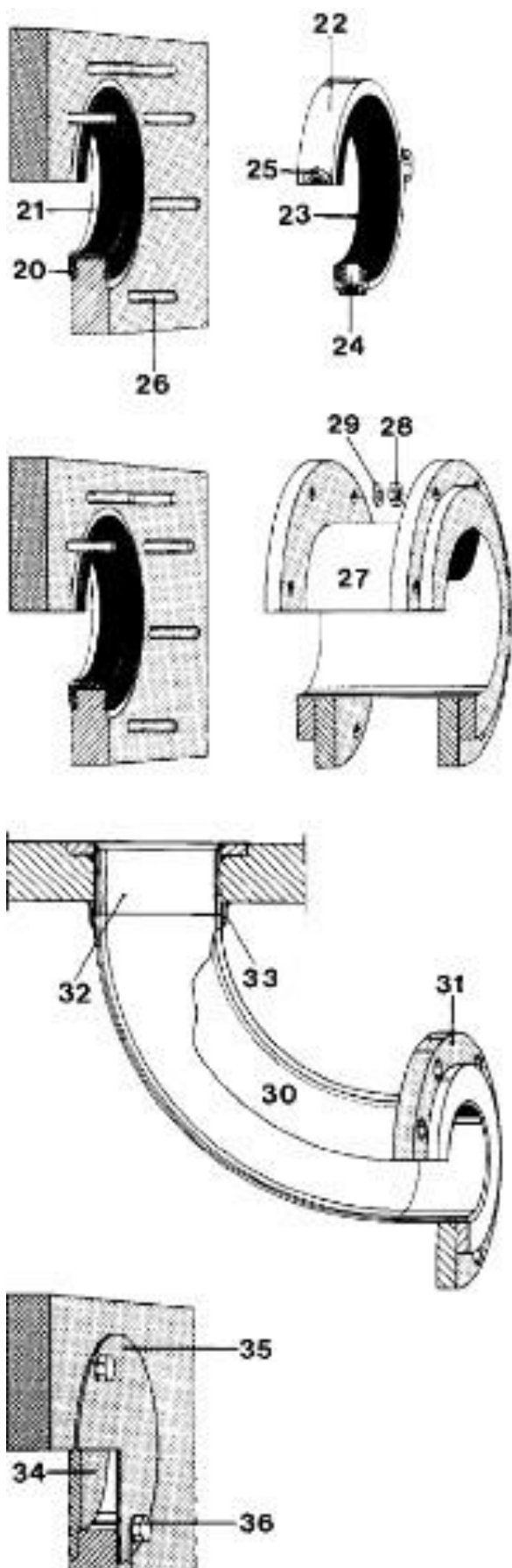
9	1	Guide washer	32239-1146-1
10	1	Thrust washer	32239-1145-1
11	1	Nut	32239-1144-3
12	1	Lock washer	32239-1143-1
1		Spanner NV 46	32220-3187-1

2		Protecting sheet	32263-0428-1
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X		Partition plate	32263-2101-1
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13		End plate II
14		Channel plates
15		End plate I

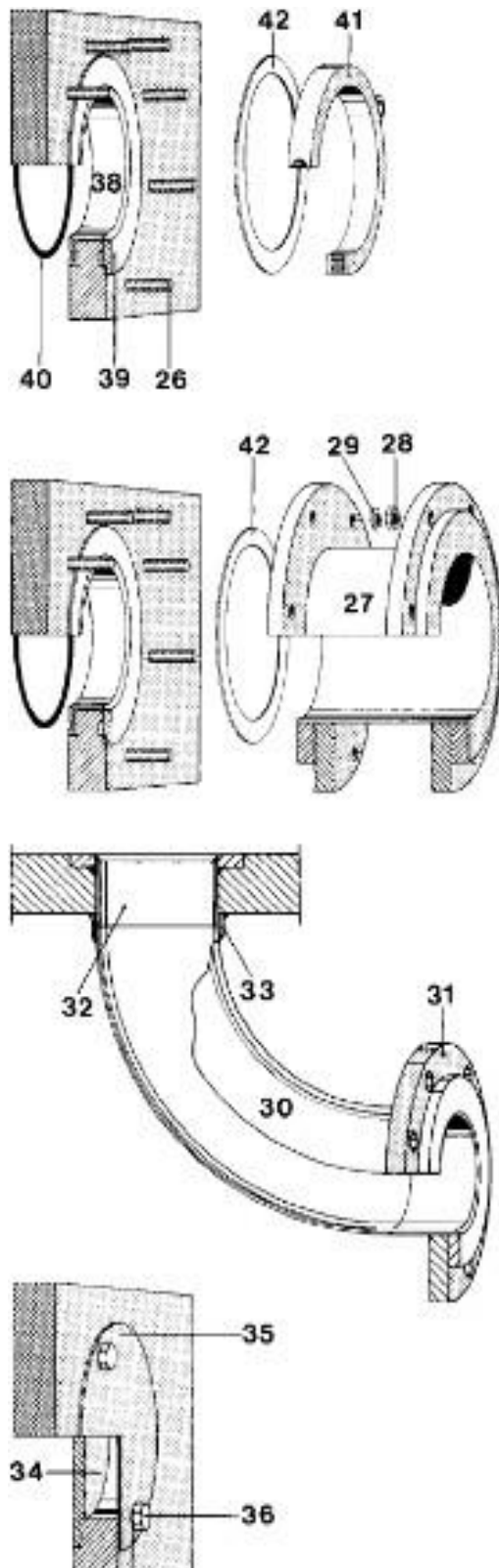
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CONNECTIONS WITH RUBBER LINING

Alt.	Pos	Qty	Description	
	20	x	Rubber lining	
1	21	1	Collar, Stainless steel	
2	21	1	Collar, Titanium	
3	21	1	Collar, Hastelloy	
INSTRUMENT FLANGE				
	22	1	Instrument flange	
	23	1	Rubber lining	
1	24	2	Instrument nipple, Stainless steel	
2	24	2	Instrument nipple, Titanium	
	25	2	Nut	
REQUIRED FOR EACH CONNECTION POS 20				
1	25	2	Stud bolt M16 (for connection DIN 2501 ST 10)	3225-0411-1
2	25	2	Stud bolt M16 (for instrument flange)	3225-0411-2
3	26	2	Stud bolt 5/8" (for connection ANSI 150)	3225-0411-3
4	26	2	Stud bolt 5/8" (for instrument flange)	3225-0411-4
REQUIRED FOR BRACING OF THERMOMETER MASS				
1	1	1	Plug (for nipple 3225-1219-1)	3225-0411-5
2	1	1	Plug (for nipple 3225-1219-2)	3225-0411-6
OUTER CONNECTION Ø 100				
DIN 2501				
1	27	x	Outer connection, Stainless steel	3225-0411-1
2	27	x	Outer connection, Titanium	3225-0411-2
ANSI 150				
3	27	x	Outer connection, Stainless steel	3225-0411-3
4	27	x	Outer connection, Titanium	3225-0411-4
OUTER CONNECTION Ø 125-100				
x			Outer connection, short, Stainless steel	3225-0411-1
x			Outer connection, long, Stainless steel	3225-0411-2
OUTER CONNECTION Ø 100-80				
x			Outer connection, Stainless steel	3225-0411-1
REQUIRED FOR EACH OUTER CONNECTION				
23	B		Nut M16	3150-0411-1
23	B		Washer	3150-0411-2
1	31	x	Connection bend, Stainless steel	3225-0411-1
2	31	x	Connection bend, Titanium	3225-0411-2
3	31	x	Connection bend, Hastelloy	3225-0411-3
1	31	x	Loose flange DIN 2501 ST10	3150-0411-1
2	31	x	Loose flange ANSI 150	3150-0411-2
1	32	x	Hole, Stainless steel	3225-2337-1
2	32	x	Hole, Titanium	3225-2337-2
3	32	x	Hole, Hastelloy	3225-2337-3
REQUIRED FOR LOCKING OF CONNECTION BEND				
32	B		Clamping shoe (not for titanium)	3225-2337-1
	B		Securing angle (only for titanium)	3225-2337-2
	B		Screw (only for titanium)	3225-2337-3
SEAL FLANGE FOR FRANK				
34	x		Seal flange	3225-0411-1
35	x		Covering plate	3225-0411-2
36	x		Screw M10 x 40	3225-0411-3
37	x		Washer 8x8 10.5 x 22	3150
SEAL FLANGE FOR PRESSURE FLANK				
x			Seal flange	3225-2334-1
INSPECTION COVER DIN 2501 M16				
x			Inspection cover, Stainless steel	3225-1210-1
x			Inspection cover, Titanium	3225-1210-2
INSPECTION COVER ANSI 150				
x			Inspection cover, Stainless steel	3225-1210-3
x			Inspection cover, Titanium	3225-1210-4
REQUIRED FOR EACH INSPECTION COVER (DIN-CONNECTIONS)				
B			Nut M16	3150-0411-1
B			Washer	3150
REQUIRED FOR EACH INSPECTION COVER (ANSI-CONNECTIONS)				

CONTROLLED DISCLOSURE



METAL CONNECTIONS

Qty	Pos	Qty	Description	Draw Level	Part number
1	38	1	Stainless steel Connection	32263-0413-1	
	38	1	Flange	32263-0414-1	
	40	1	Gasket	32263-2894-4*	
2	38	1	Titanium Connection	32263-0413-2	
	38	1	Flange	32263-0414-2	
	40	1	Gasket	32263-2894-4*	
3	38	1	Hastelloy Connection	32263-0413-3	
	38	1	Flange	32263-0414-3	
	40	1	Gasket	32263-2894-4*	

TREATMENT FLANGE

41	x	Instrument flange, red brass	32263-1240-1
	x	Plug	32263-0955-1

REQUIRED FOR EACH CONNECTION POS 38

1	26	3	Stud bolt M16 (for connection DIN 2501 NF10)	31801-1017-3
2	26	3	Stud bolt M16 (for instrument flange)	32263-2202-2
3	26	3	Stud bolt 5/8" (for connection ANSI 750)	32263-1242-1
4	26	3	Stud bolt 5/8" (for instrument flange)	32263-1242-2

OUTER CONNECTION # 100

Qty	Pos	Qty	Description	Draw Level	Part number
2	27	x	Outer connection, Stainless steel	32263-1201-1	
	27	x	Outer connection, Titanium	32263-1201-2	
3	27	x	Outer connection, Stainless steel ANSI 150	32263-1201-3	
4	27	x	Outer connection, Titanium	32263-1201-5	

OUTER CONNECTION # 125-100

x		Outer connection, short, Stainless steel	32263-0451-1
x		Outer connection, long, Stainless steel	32263-0451-2

OUTER CONNECTION # 100-80

x		Outer connection, Stainless steel	32263-0451-1
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REQUIRED FOR EACH OUTER CONNECTION

28	6	Nut M16	31801-1017-3	
29	8	Washer	10480	
42	1	GASKET	32263-04	
1	30	x	Connection body, Stainless steel	32263-0424-1
2	30	x	Connection body, Titanium	32263-0424-2
3	30	x	Connection body, Hastelloy	32263-0424-3
1	31	x	Loose flange DIN 2501 NF10	31316-0795-1
2	31	x	Loose flange ANSI 150	31316-0795-2
1	32	x	Weld, Stainless steel	32263-2217-4
2	32	x	Weld, Titanium	32263-2217-2
3	32	x	Weld, Hastelloy	32263-2217-4

REQUIRED FOR LOCKING OF CONNECTION BODY

33	3	Clamping plate (not for titanium)	32263-2217-1
	3	Securing angle (only for titanium)	32263-2217-1
	3	Screw (only for titanium)	221445-07

SEAL FLANGES FOR FRAME

34	x	Seal flange	32263-2104-1
35	x	Covering plate	32263-2119-1
36	2	Screw M8x 10 x 45	271740-02
37	2	Washer EFB 10.5 x 22	41455

SEAL FLANGES FOR PRESSURE PLATE

x		Seal flange	32263-2104-1
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INSPECTION COVER DIN 2501 NF10

2		Inspection cover, Stainless steel	32263-1230-1
2		Inspection cover, Titanium	32263-1230-2

INSPECTION COVER ANSI 150

x		Inspection cover, Stainless steel	32263-1230-3
x		Inspection cover, Titanium	32263-1230-4

REQUIRED FOR EACH INSPECTION COVER (DIN CONNECTIONS)

3		Nut M16	31801-1017-3
3		Washer	10480
1		Gasket	32263-04

CONTROLLED DISCLOSURE